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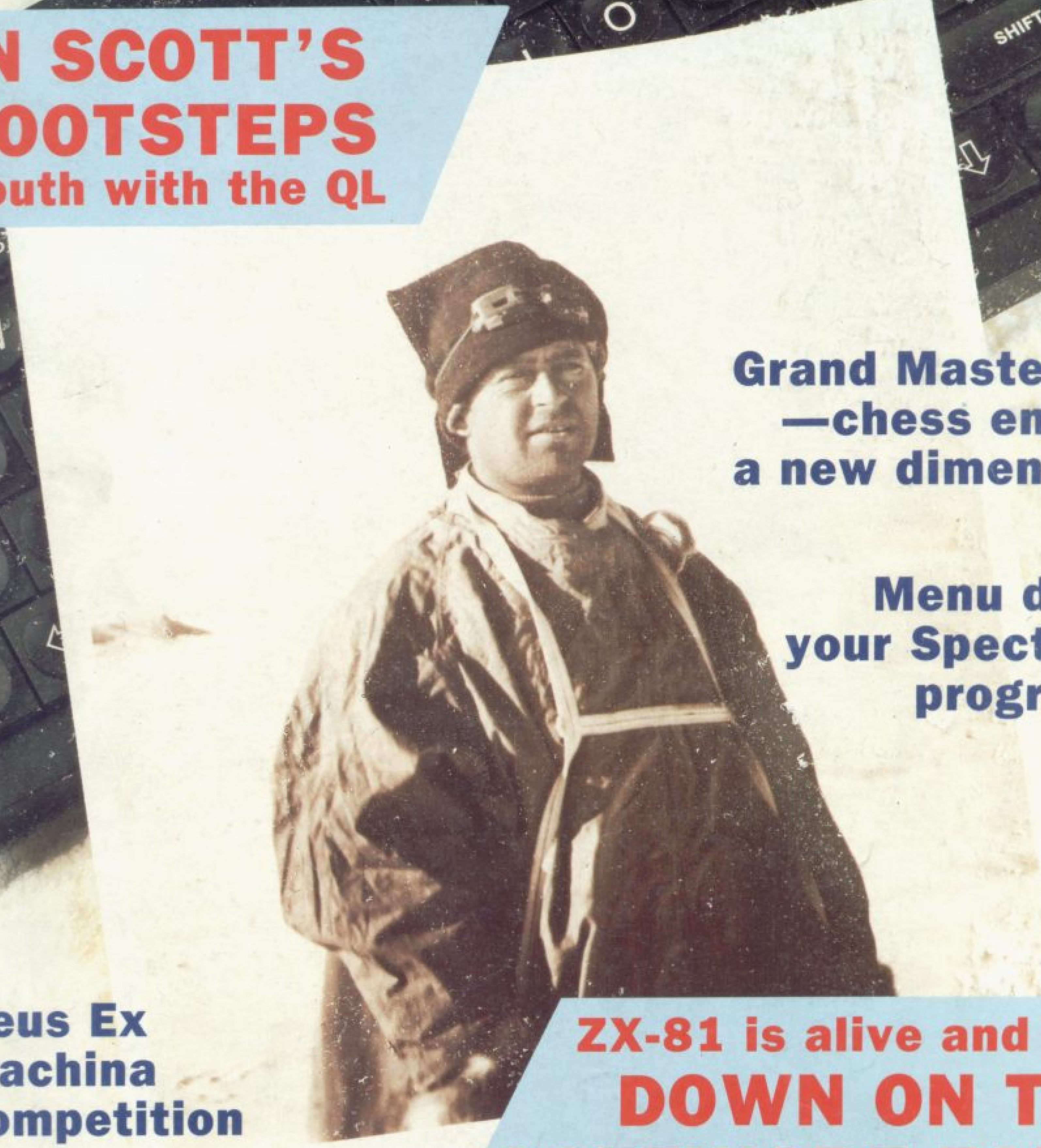
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Issue No 34

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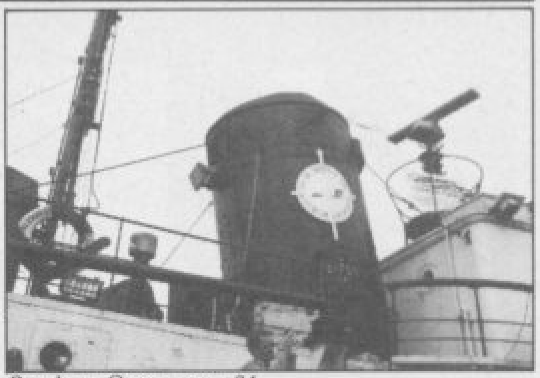
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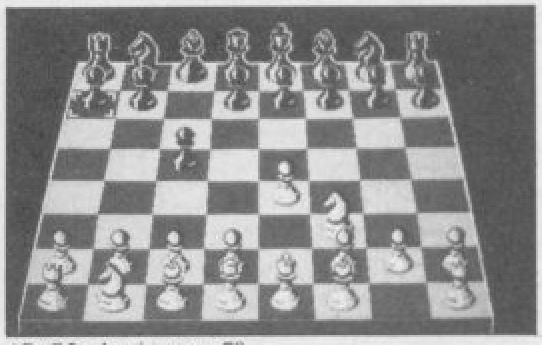
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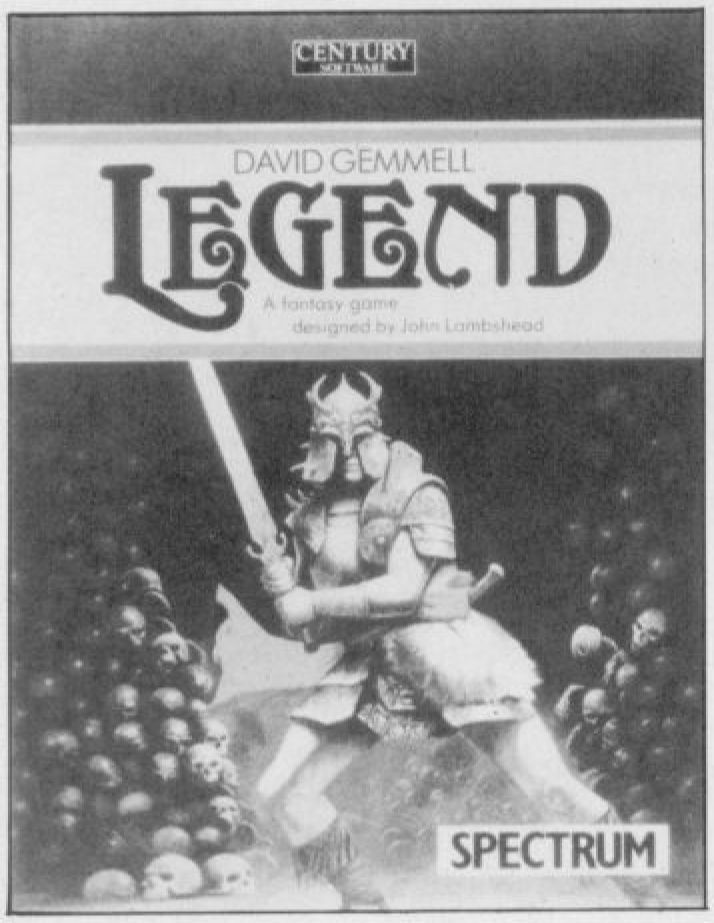
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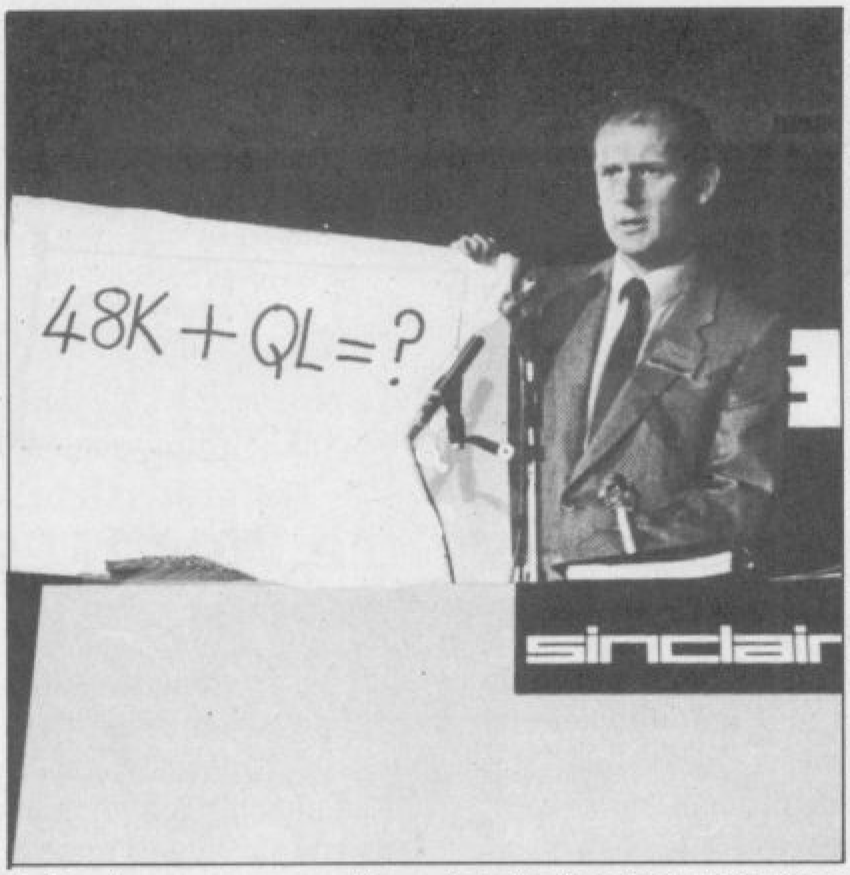
SU

THINGS TO COME

A YEAR AGO *Sinclairvoyance* speculated on Sinclair's expected move into the business market and the continuing success of the Spectrum. Events in 1984 confirmed both, though no-one could have anticipated the eccentric mishandling of the QL and the subsequent caution with which that machine was to be regarded by manufacturers and buyers alike. At the beginning of 1985 it is still uncertain whether the QL will sell in the quantities hoped for by Sinclair research, and which will justify large investment by software houses. The advent of disk drives, expansion boards and applications software from Quest is just one sign amongst many that the QL is nevertheless ready for lift-off.

What is more uncertain is the future of the Spectrum. Had not the Spectrum+ appeared, things would have looked decidedly dicey for our old friend. With Commodore. Amstrad, MSX and others prepared to slog it out in 1985 it is difficult to see how Sir Clive would have retained his market share.

The Spectrum+ might have changed all that. Internally the same as its little sister, it is an altogether different beast. In discarding those putty rubber keys Sinclair has transformed a games machine into an inexpensive and viable alternative to its rivals. Programming becomes faster and, once you have become accustomed to the all-white key legends, easier. Sensible word-processing is within reach. No more feats of dexterity to sample the dubious delights of inverse video, no more tugging and wiggling at that worn power lead . . .



Even more attractive is the inclusion in the price of a slightly different version of the Spectrum Six Pack, intended to always accompany the Spectrum+, something which Sinclair did not make clear when the machine appeared. That software is worth more than £50.00 and consequently the £179.95 price for the Plus is not as exorbitant as it seems at first glance.

That leaves the old 48K, minus the now-discontinued software promotion, looking rather sorry for itself and it is inevitable that many potential customers will buy the Plus in preference. Sinclair Research hopes of course, that it has not merely split the market share it already has but in addition stolen some from Commodore and chums as well. Any price reduction in the 48K is again likely to increase that share without reducing sales of the Spectrum+ to any large extent. In other words, Sinclair has covered all the bases and is simply waiting for the away team to pitch. It can't fail to score.

Sinclair has further tricks up its lab coat sleeve. Whispers abound that the Plus might be further upgraded to take onboard the Interface 1 and even a cartridge slot. The basis for that speculation seems to be little more than the fact that the Plus was codenamed *Thunderbird*, and, as the ageing ones amongst is will know, there were five *Thunderbird* craft in the TV series. Nigel Searle has kicked that one into touch by explaining that the designer was a Ford Thunderbird fanatic, though he hasn't ruled out the possibility of upgrades.

Sir Clive too has been unusually garrulous on the shape of things to come, waxing lyrical about a portable in the pipeline. The portable micro will be battery-powered and incorporate microdrives. It will also have a flat-screen display — but then he said that when the QL was in planning.

The Spectrum Plus Handle, or the QL Minus, will retail at about £300. But don't hold your breath waiting: Sir Clive has said that it will appear in 1985, probably late 1985 — well, possibly 1986. Or even . . .

Despite all the carping about Sinclair's achievements there is no doubt they are rock-solid in the final analysis. One company to recognise that is ICL, and in announcing its OPD executive toy has signalled a new departure for Sinclair.

The OPD — One Per Desk — is a nifty combination of monitor, keyboard, microdrives and telephone handset which is the ultimate businessman's tool. It offers all the QL software and an amusing built-in speech synthesiser with 200 words for leaving rude messages on your telephone. It can do much more besides, but what interests us is the presence of Sinclair chips, microdrives and Basic in the design. Not only is the OPD an innovative approach to desk-top computers but it is the first time that Sinclair has been heavily involved with the product from another major company.

Lest you feel that in reaching for the business sky Sinclair Research might have neglected its down-to-earth home users, rest assured: it seems that the Spectrum+ has been bedevilled with the kind of teething problems Sinclair followers have come to expect and fondly treasure.

Some units have 'slipped' through Sinclair's QC net and a few fortunate users have discovered that not only are the keys a great improvement on their plasticene predecessors but are detachable as well. Some machines arrived with assorted keys scattered around the packaging like so many Scrabble tiles.

Middle Eastern carpet weavers used to incorporate deliberate flaws in their designs because only Allah could create anything perfect. Perhaps the distinctive Sinclair bugs and design faults are Sir Clive's errors of humility — his personal, desperate attempt to avoid hubris.

Bill Scolding

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IF YOU WANT to communicate with ZX-81 users worldwide, now is your chance.

ZX Exchange is a group of users dedicated to the ZX-81 and companion machines, TS-1000 and TS-1500. A newsletter, the *ZX Broadsheet,* is circulated at approximately bi-monthly intervals to users as far away as Hong Kong, Mexico and Australia.

The *ZX Broadsheet* covers the main areas of interest to ZX-81 users with routines as its main feature. Exchange Profile is a column in which people can talk about themselves, their interests, equipment and exchange information with other users.

If you would like to participate in this international user club you can obtain a trial issue of the newsletter by sending £0.60 (UK) or five International Reply Coupons to Nick Godwin, 4 Hurkur Crescent, Eyemouth, Berwickshire, Scotland TD14 5AP or telephone Nick on Eyemouth (0390) 50965 between 10am and 10pm.

Plus teething problems

THE SPECTRUM+ is only going through some minor 'teething problems' according to Sinclair Research, despite the fact that on some machines the keyboard falls to pieces.

Julian Goldsmith, of Sinclair Research, says: "With any new products there are bound to be problems. The suppliers are AB Electronics, Thorn EMI and Timex. If there is a problem and we hear complaints then we just talk to the suppliers and get them to make the glue thicker or add a millionth of a millimeter to the clip-on part of the keyboard. We have had complaints about the keyboard and of course we will take note of them."

Should problems occur with your Spectrum+ you are advised by Sinclair Research to take it back to the place of purchase. "The main responsibility, of course, is with us," Goldsmith admits. "Most retailers do their own QCing and we leave it to them to spot faulty machines.

Retail stores, such as Boots, are moaning because they cannot get enough of the Spectrum+. All the company would say is, "they are selling very well".

WH Smith is also not getting enough of the machines. A spokesman at one London branch commented that despite the slow start they had no problems with returns. They wished only that they could get a few more machines.

The tale at Smiths was repeated at The Buffer Micro Shop. Michael Howard, owner, says: "The only problem we have is getting the Spectrum+. We were late in ordering by one day and chain stores such as Smiths got all of them". That was the first delivery made and, at the time of writing, there had not been another one.

If you are still in a dilemma about what to do if your Spectrum+ keyboard falls to bits then Sinclair Research has had a suggestion passed on. Start chewing a lot of gum.

Sinclair admirer

THOSE microdrives have gained one ally in the form of ICL which has launched a computer called One Per Desk.

The machine, uses the QL circuit board, which includes the Sinclair ULA, with microdrives and includes a modem, terminal emulation software and monitor.

ICL is taking the Sinclair Research lead and supplying the Psion XChange software suite, with upgraded versions of Quill, Archive, Abacus and Easel, on in-built ROM in the package which is to sell for £1,200.

Sinclair Research is pleased that ICL has delivered its well-timed pat on the back for its pioneering stance in computing. A spokesman for the company says: "It is nice to see that other people are endorsing our technology."

Supporting role for Quest

A NEW RANGE of QL packages from Quest Automation turns the Sinclair machine into a powerful business microcomputer.

The software is headed by a 68K version of the CP/M, specially designed for 68000 processors. The 28.5K operating system is supplied either on 5¼in floppy disc for £49.50 or microdrive cartridge for £79.50. It includes an assembler, co-resides with QDOS and will support 3in, 3½in, 5¼in and 8in floppy discs. It can also be used with a Winchester disc unit.

Quest is also supplying a range of disc drives on which CP/M can be run. Those range from a 200K floppy at £249 to a range of Winchester discs, minimum storage 7.5 megabytes, which starts at £995.



If extra internal RAM is required Quest can supply a range starting with 68K for £99 to half-megabyte at £499. All the equipment can be stored in an expansion console costing £109.

To support its new system Quest has released two business packages, collectively called Tally.

The software is compatible with the Psion packages supplied with the QL which means that data can be transferred from the Quest packages to the Psion programs and vice versa. Quest says that it is a deliberate ploy which will be continued.

Wildest dream is fulfilled

SOMETHING you would never have thought of in your wildest dreams is renting software on a nightly basis.

A new company calling itself Wildest Dreams came up with the idea whilst discussing the problems of producing and distributing software. The games were to be available for rental in video shops nationwide from November, for the princely sum of around 50p per night.

The games are all new and will be for rental purposes only.

Asked about the subject of piracy, the company says, "Piracy occurs because people are loath to pay around £7.00 for a games tape, whereas 50p is a low enough margin to discourate piracy."

more news on page 10

Hacker's lèse-majesté

IF THE Duke of Edinburgh's Prestel Account can be broken into, think what fun a hacker could have with the Stock Exchange prices.

The latest exploit to reach the national newspapers and make Prestel tremble in its shoes is that of a hacker claiming to be a freelance writer of Micronet 800 — an information database and, ironically, part of the Prestel system.

Prestel received a telephone call recently asking staff to look at Page 1, Prestel's index page, accessible to only a few members of the Prestel team. INDEX was spelt IDNEX. The hacker had broken in.

Breaking into the system via one of the Prestel Development computers he found the identity number and password of Prestel's Assistant Editor. With that information he had enough ammunition to break into the system, call up anybody's ID and password and access any page on the database.

He decided to aim for the top, accessed the Duke of Edinburgh's Prestel account and had the time of his life sending messages from people who, at the time, were fast asleep — it being the early hours of the morning.

One message was sent from the Duke of Edinburgh to the General Manager of Prestel congratulating him with, "The household is very impressed with your work."

Another area cracked was Homelink — Prestel's home banking system where users holding accounts at the Nottingham Building Society and the Bank of Scotland can access accounts from home.

Two weeks after Prestel was bugged, Homelink sent out a message reassuring its customers that though Prestel had been hacked, the Homelink database was unbreachable. "Rubbish", came back the reply, "the Homelink database was broken into". It was signed by The Hacker using the Bank of Scotland ID.

Two weeks after the Prestel incident Homelink still had not changed the ID numbers and passwords.

Prestel got the message immediately and has made all the necessary security changes. One wonders, though, when and where the hacker will strike next.

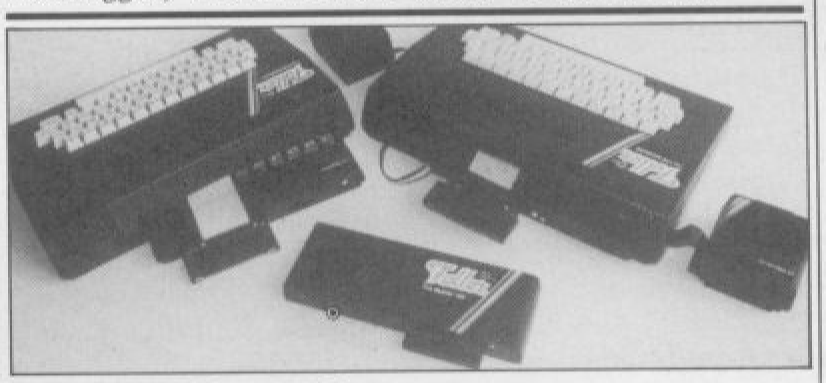
Professional QL compiler

THE FIRST true compiler for the QL has been launched by Bristol-based software house Metacomco.

The compiler runs BCPL, Basic Combined Programming Language, which is widely used as the systems programming language on many different minis and micros.

BCPL is ideal for writing utilities, applications programs and even games. The package also supplies routines which will make the QL graphics and window facilities easier to use.

Metacomco is to sell BCPL for £59.95 and is also releasing a version of LISP for the same price.



Nordic cleans up

NORDIC KEYBOARDS, the company which has acquired the Fuller range of products after it went into liquidation a few months ago is trying to make amends to frustrated customers owning Fuller keyboards.

John Gray of Nordic Keyboards says he is delighted with the opportunity to market the products and adds, "but we aim to offer our customers a better deal and to be faster on both service and delivery."

A problem has arisen over faulty keyboards returned to Fuller before they went into liquidation.

"It is a knotty problem," says Gray, "because of Fuller's records. We have a lot of keyboards awaiting repair but without any attached documentation. As we come across keyboards with the owners' names and addresses we'll repair and return them."

On a more optimistic note, Nordic have launched the FDS Executive, a replacement keyboard for the Spectrum. The Executive allows the user to plug his Spectrum straight into the keyboard without having to unscrew the Spectrum case and at only £59.95, Nordic believe it will be a winner.

QL sales variable

THE QL has been greeted with mixed reactions by the retail trade. While stores such as WH Smith and Boots are pleased with sales, smaller outlets are not so happy.

A spokeswoman for WH Smith says: "The QL is selling out fast. We are having no problems with the machine but would like to see more software for it."

The same is true of Dixons. Dave Gilbert, a spokesman for the company, says: "We can't get enough of them. It is selling very well. We have had no problems with orders and we get all that we need."

Smaller shops are having a limited success with the QL. John Arundel of The Silica Shop in Kent says: "We have the QL and some people have bought them. They are slow to move though."

Michael Howard of the Buffer Micro Shop reports a similar story. "We are getting all the QLs that we need. They are not going in vast numbers but we are selling them."

Sinclair Research is confident that the slow start will turn into a rush when more people realise that the machine is in the shops.

A spokesman says: "Dealers are happy with the QL. Word is out that it is in the shops now and sales will increase accordingly."

Joysticks recall

AGF are anxious that some early customers who purchased Protocol 4 joystick interfaces may have sub-specification pre-production units.

The problem with those units is that they have an erratic or unreliable Kempston operation mode and the way to check this would be to type in the following program line with the Protocol 4 attached to the Spectrum, its mode switch in the down position and with the Kempston card inserted: Print IN 31, press ENTER.

If anything other than 0 is printed, the unit should be returned to AGF for a free replacement. The address for returns is: AGF Hardware, FREEPOST, Bognor Regis, West Sussex, PO22 9BY.

more news on page 12

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Grandmasters of Midnight

THE WINNER of the **Doomdark's Revenge** competition, in the October issue of *Sinclair User,* is Philip Middlewood of Great Barford, Bedfordshire.

The 25 second prize winners are: Chris Herbert, Frating, Essex; Jack Kelley, Penicuik, Scotland; John Northcliff, Adwick-upon-Dearne, Doncaster; Martin Dowie, Cupar, Fife; Matthew Stott, York; Stephen Trayler, Wimborne, Dorset; P Mills, Coventry; P W Camp, Cowley, Oxford; Richard Taylor, Lichfield, Staffordshire; Howard Davies-Carr, Stoke Bishop, Bristol; Kev Crocombe, Sheffield; David Finch, Barmouth, Gwynedd; R Kerr, Blantyre, Glasgow; Sheridan Pynes, Bexleyheath, Kent; Louis Clement, Richmond, Surrey; Kevin Mullowney, Beeston, Leeds; P D Tidy, Newbury, Berkshire; T Aviss, Hadleigh, Suffolk; C P Sempers, North Ferriby, North Humberside; Stuart Johnson, Sunderland, Tyne and Wear; J Rogers, Oldbury, Warley; Mark Wallis, Haywards Heath, West Sussex; Janette Fowler, Grangemouth, Central Region; Paul Matakitoga, Yeovil, Somerset; Christopher Ambrose, Stockport, Cheshire.

The 25 runners-up are: A G Simson, London SW9; Alan Rowlands, Telford, Salop; B White, Marlow, Buckinghamshire; Glen D Brock, Cheney, Oxfordshire; J Ellis, Paignton, Devon; Andrew Edwards, Leicester; Alex Hughes, Solihull, West Midlands; Ian Morris, Bovey Tracey, South Devon; Ben Wharton, London, NW6; Michael Park, Scarborough, North Yorkshire; M H O'Connor, Crediton, Devon; Jean-Yves Rouffiac, London, NW1; S Stanway, Trentham, Staffordshire; C D Sheldon, Swansea; Elane Davidson, Dumbartonshire, Scotland; Russell Keyte, Southampton; Ian Clark, Edinburgh; Dave Freeman, Purley, Surrey; S L Brasington, Rhyl, Clwyd; Chris Boorn, Gosport, Hampshire; G C Taylor, Crossford, Fife; Ian McVicar, Mount Blow, Clydebank; G Walton, Willenhall, West Midlands; George Turnbull, Leeds, West Yorkshire; Alan Gough, Southampton.

Piracy policemen

A FIGHTING fund has been established by the Guild of Software Houses which will be used against piracy.

Contributions to the fund will initially be made by the group's 34 members but Paul Duffy, General Secretary of GOSH, states that anybody can put money into the pool. "We would also like to get publishers and other people connected with the industry involved."

Duffy went on to say that GOSH wants to bring a major case against a software pirate. "That involves a lot of money, perhaps as much as £100,000. Even if we lose that will give us good grounds to go to MPs and say that the law does not stop piracy.

"We are writing to local councils telling them that if school equipment is used for piracy then we will hold the school responsible and prosecute them."

The comrades' conundrum

A £25,000 prize is being offered to the first person who can crack **Eureka!,** a five part arcade/adventure game for the Spectrum.

The scenario for the adventure, featured in Software Scene this month, was penned by games wizard Ian Livingstone and the product is being marketed by Domark, a company run by Dominic Wheatley, grandson of the novelist Dennis Wheatley, and Mark Strachan.

Domark claims that the game was the result of 10,000 man hours by a Hungarian programming team behind the Iron Curtain. The team of 20 includes four graphic artists, two musicians, a professor of logic and an Oscar winning cartoonist.

The competition ends on 31 December 1985 and Domark believes that it could take 15 months to solve.



Clive's dive

REPORTS begin to filter through of strange happenings at **Sir Clive's** London residence earlier in the Summer. While the final details to the refurbishment were being carried out, the basement flooded. Workers carrying pot plants to the roof garden were stuck in the lift. To cap it all, Sir Clive's jacuzzi wouldn't work. How galling it must be to come home from a hard day dealing with QL complaints only to discover your hi-tech bath is bugged as well . . .

We cannot imagine Sir Clive relaxing in his jacuzzi without some form of mental stimulation. As a tamer alternative to dipping **Acorn** bigwig **Chris Curry** in the pool as a substitute for motherhood? . . .

Talking of mothers, Ferrari-lover **Bruce Everiss,** former operations director of **Imagine,** has been holding forth to any journalists still prepared to listen to the 'true' story behind the downfall of Imagine. In the interests of simplicity, Everiss omits to mention such obscure events as the bugging of **Colin Stokes'** telephone, the dawn raid on his house, the accusations flying around that Imagine went so far as to hire private detectives to report on the plans of other software companies. The Gospel according to Bruce now has it that Imagine's directors were simply young, green, and

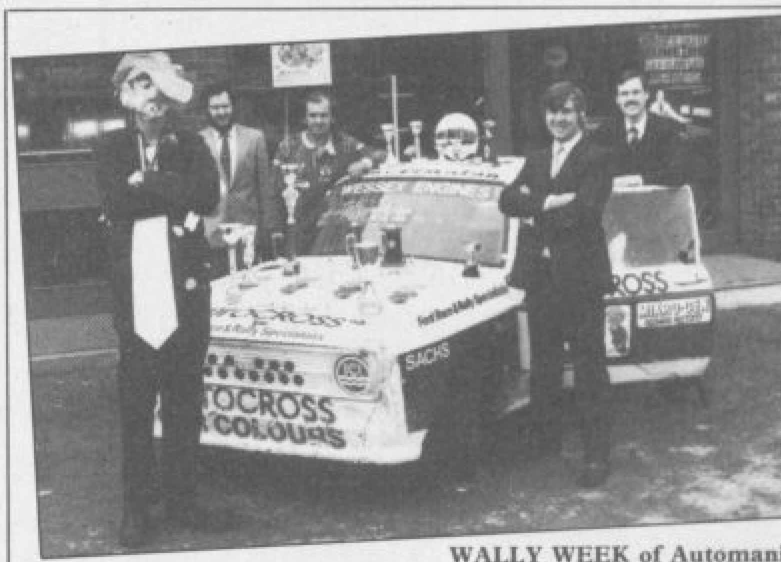


MARK FIDDIAN of recently launched Streetwise Micros tries to flog a Spectrum + to Topo the redundant robot. Next month, when the organisers finally persuade Topo to turn the black box upside down, we shall expect further news on what happens when all the keys fall on the floor.

— as reported in *Microscope* — he might enjoy reading the first issue of *Micro Arts.* The foreword of this extremely pretentious magazine was penned by one **Clive Sinclair,** and contains a lyrical exposition of the therapeutic qualities of hacking. "It is the Computer personality who dares face change without feeling the sense of loss that goes with the departure from the womb" rambles 'Clive'. We know he wants to abolish doctors and schoolteachers in favour of computers, but the Spectrum foolish enough to actually believe all the harmless untruths — sorry Bruce, totally justifiable marketing hype — that St Bruce was telling about the company . . .

Next, according to Bruce, is the possibility of a book about how the games industry works. Readers are invited to send in their ideas for the title — 20,000 unused copies of **Schizoids** for the best entries. . .

Liverpool hype is not the only hype around. **Haresoft,** producer of the intensely boring **Hareraiser** competition/



WALLY WEEK of Automania and Pyjamarama embarrasses his Mikro-Gen pals in bad taste pic of the month. Wally is peeved that the universe does not think his games are better than Jet Set Willy or Kokotoni Wilf, and wants readers to vote on the matter. Wally is the one on the left.

game, has informed a stunned world that a clue to the puzzle was revealed by TV personality **Anneka Rice** in Harrods one Saturday. Who, if anybody, was there to hear the golden girl's words of wisdom is not stated on the press release, but if anyone did perhaps they could let us know what the clue was and we can pass it on to whomever, if anybody, has bought the game. . .

A further item from the prolific Haresoft PR people sheds light on the decision to release the game in two parts: "To make it fun and enable competitors of all ages to participate." Bet you thought it was just to make more money. . .

What with hackers infiltrating Phil's Prestel account, it seems the **Windsors** are getting plenty of free publicity from the micro-world. Now comes news of **Di's Baby,** a new game from **Bad Taste Software.** Gremlin will report further as soon as a convenient bedroom window is left open. . .

Great news for **Spectrum +** owners. **Cheetah,** flushed with success at abolishing everybody else's joysticks with the toothless infra-red **RAT,** has announced that all its software and hardware is compatible with the new Spectrum. Not only has the company achieved full compatibility incredibly quickly following the Spectrum + launch, it has even managed to do it without spending so much as a penny on the operation — excepting of course the cost of writing the press release. . .

Brazen Backslappers' award for January must surely go to **Hewson Consultants.** The company has presented a gold cassette — no, not **Alchemist** with the game wiped off — to its own programmer **Mike Male** for selling 100,000 cassettes of his games **Nightflite II** and **Heathrow ATC.** Mike has made so much money out of the games, we are told, that he has been able to buy his own aeroplane. . .

Finally, to prove we can play the game as well as anyone else, hot news from the Turkish desert via the back pages of *Computing* magazine. Apparently one of the paper's correspondents was on holiday in the remote east of the country and seeking an English newspaper to read over his curd cheese and olives. The only paper available in the whole town was *Sinclair User* — copy upon copy. If you know anything more about the great yearly migration of computer magazines along the caravan routes to the mystic Orient, please write to: Gremlin, Oasis 37, The Road to Samarkand, Babylonia. . .

First, a question.

Who do you think are the world's most avid consumers of microcomputers?

The ingenious Japanese? The fashionable French? The acquisitive Americans?

Believe it or not, it's we British who own more micros per person than any other nation on earth.

Yet, despite its amazing impact, the microcomputer has only just begun to scratch at the surface of our lives. Without doubt, the best is yet to come.

Use and Abuse.

In several recent surveys, some astonishing facts about micro use and abuse were revealed.

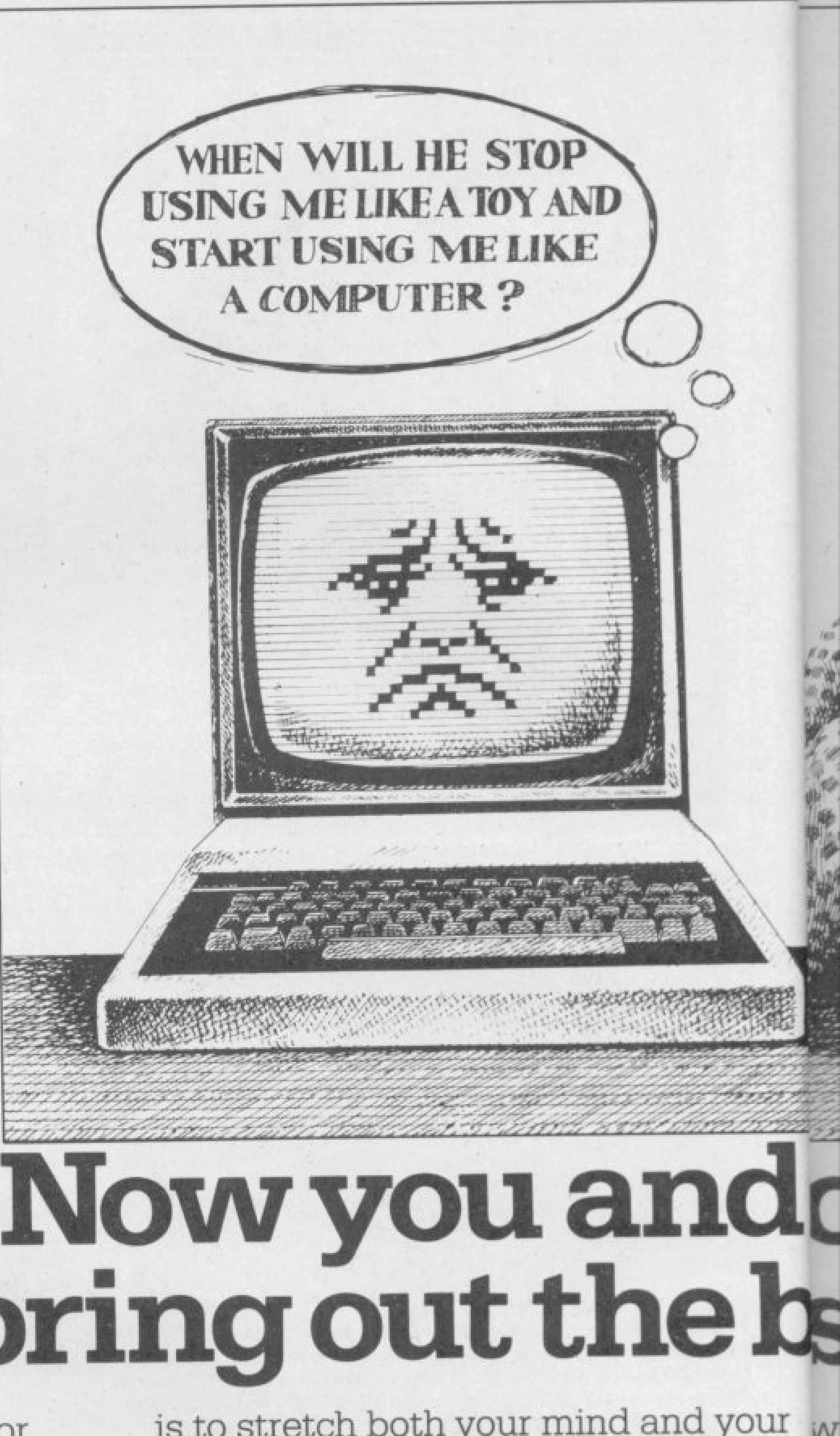
It was discovered that the micro is hopelessly under-utilised. If you're already a micro owner, your own experience may well confirm this unhappy state of affairs.

Brainpower. A source of knowledge.

For thousands of years, the key to self improvement has been in the hands of the written word. Now, thanks to the Brainpower range, it's very much in the hands of the micro.

As the Brainpower range demonstrates, this does not require prior knowledge of micros, or how they work.

The Brainpower concept has been devised as *integrated* applications and educational software. And its aim is to stretch both your mind and your imagination.



Now you and
bring out the b



Each Brainpower title provides a unique three part package: an applications program; a teaching program and an illustrated manual and interactive tutorial – integrated applications and educational software

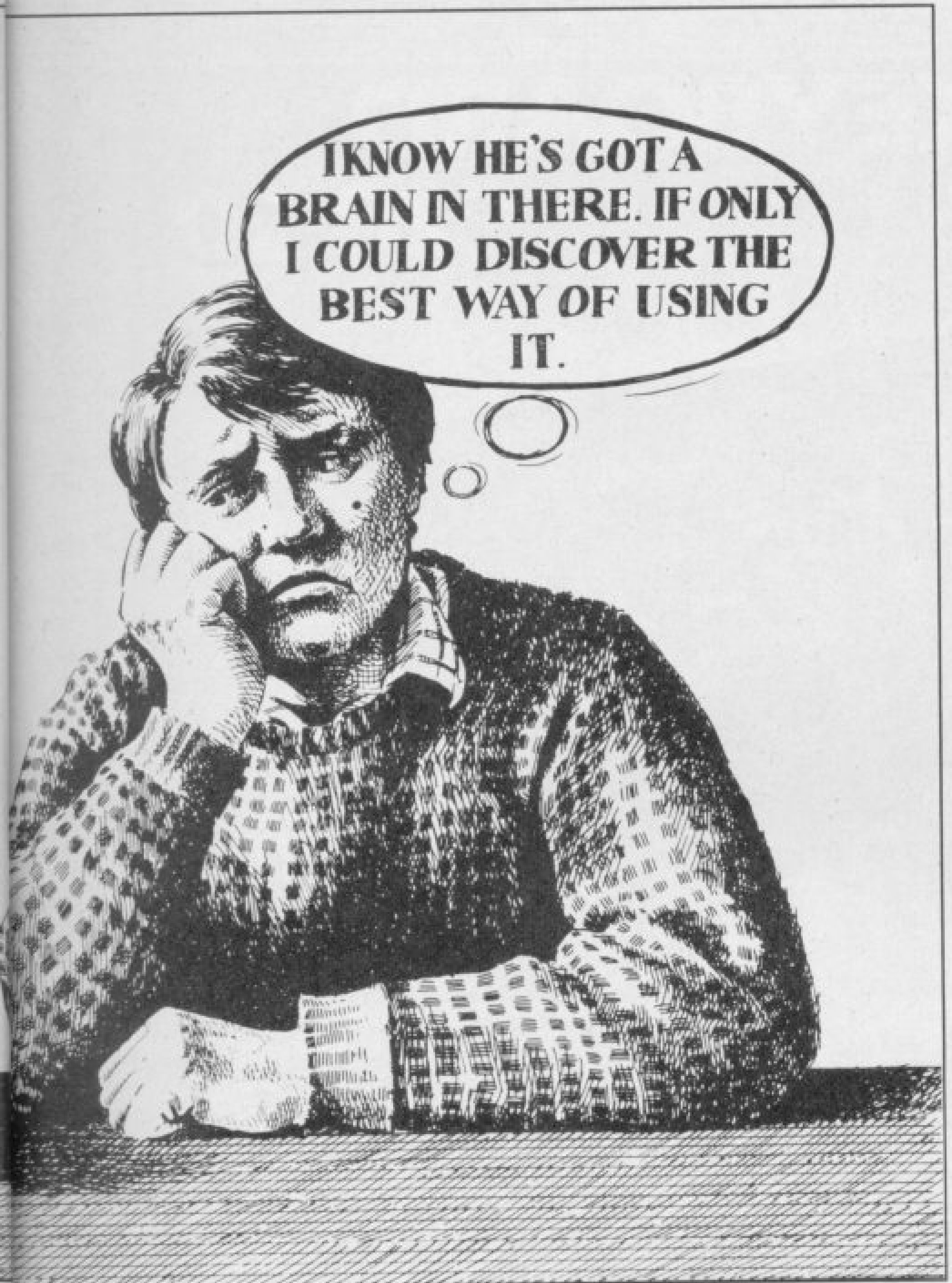
It offers a unique way to realise your own full potential and that of your micro. In a way you could never hope to achieve from the printed word alone.

In this respect, the Brainpower range stands on its own.

A unique concept.

All the Brainpower titles share one thing in common, apart from their stimulating subject matter, that makes them unique.

You will find each title comprise three distinctive elements: A teaching program that helps you to get to grips

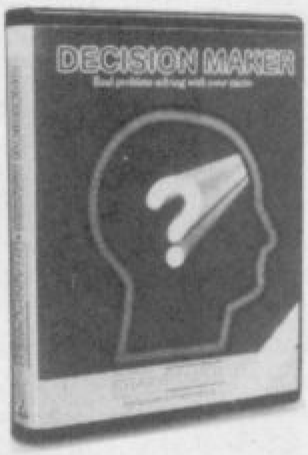


STAR WATCHER

The secrets of the heavens are yours. Isolate all the constellations as well as main stars for easy identification. Even turn stars and constellations on and off at will. Screen by screen, you will see exactly how the 1,500 brightest stars move through time and space. And all from any point on the Earth's surface at any time of the year.

Star Watcher is without doubt the definitive home observatory.

DECISION MAKER



Should you buy a new house? Change jobs? Have children? Start your own business? Such decisions should not be taken lightly. Armed with Decision Maker, you can be quite sure of examining every avenue, and arriving at a rational, structured answer.

If you value the way you run your life, you need Decision Maker.

NUMBERS AT WORK

Tackle all the number problems you're likely to face in daily and business life. From straightforward multiplication and division of fractions, through decimals, percentages, ratios, mark-ups and margins to compound interest, depreciation, VAT and PAYE.

Numbers at Work gives you a distinct edge, since you will be able to both understand and manipulate numbers at will.

PROJECT PLANNER

Project Planner teaches you how to divide even the most complex project down into meaningful components. Learn how to determine the length and importance of every single task, and those elements critical to the fulfilment of your plan. Even anticipate problems you hadn't envisaged.

You have the measure of any situation because you have the fullest possible grasp of all the factors which affect it.

FORECASTER

Forecaster takes the guesswork out of forecasting, by accepting that tomorrow's events will be best predicted on the basis of today's facts. Armed with Forecaster, sales targets and growth trends, even sporting events and election results can be accurately and very quickly predicted.

Invaluable to you in both your private and business life.

d our micro can b st in each other.

ENTREPRENEUR

Entrepreneur teaches you all the steps required to plan and start your own business. It will forecast your first 18 months' cash flows, generate your Profit and Loss Account and Balance Sheet. Help you in discussions with your bank manager and partners. Explain the notions of assets, liabilities, overheads, working capital, cash flow and break even point.

Invaluable to anyone who is planning a business venture.

ur lise your pe to ne. ver with the subject at your own pace. An applications program to put what you learn into action. And finally, with each package, you get an expertly written book and interactive tutorial.

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Numbers at Work					
Star Watcher					
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Project Planner					
Forecaster					

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BRAINPOWER

Irate women bite back

I FELT I HAD TO comment on the news article entitled 'Computer machismo' in the November issue.

As a woman who has been working in the microcomputer industry for a number of years I too am extremely concerned about the lack of female interest in computers.

I do not, however, agree with the view of Ebury Software that publishing software under the *Good Housekeeping* title is going to do anything to help generate more interest. This is an extremely patronising attitude for Ebury to take, and one which will only help to further alienate women from computers and increase the sexist attitude of software publishers.

What Roger Barrett does not include in his — typically male — list of 'positive, traditional skills women have' is creativity. My own personal view is that just as soon as languages like **Logo** gain more recognition throughout the industry and begin to go into homes many women will find that most of their fears about computer programming are nonsense.

The important thing about Logo as compared to packages such as the *Good Housekeeping* type is that it gives people an outlet for creativity as well as programming or learning about computers. Creativity, which for many women has been lying dormant for a long time, will remain buried forever, if companies such as Ebury Software have their way.

Christine Roberts,
London NW1.

Accurate Adspeak?

IT WOULD APPEAR that the whole publishing industry dealing with magazines and books really needs to examine its methods more closely. Computing requires the utmost accuracy in all aspects of programming, yet in all publications, the number of mistakes which occur is appalling.

In addition, although much of your income is derived from advertising, some of the advertising material verges on downright deceit. Keyboards are a prime example. Most adverts state 'five minutes and a screwdriver'. Yet we then read reviews where screwholes won't line up, casings have to be cut and other horrors. Some advertisers would surely have difficulty in explaining their blurb to the Advertising Authority, and not just on keyboards either.

Why can't we have magazines which don't have mistakes and advertisers who get a little closer to the truth about their products?

A J T Longhurst,
Desborough,
Northamptonshire

Peripheral round-up

I AM getting a ZX Spectrum this year for Christmas and after reading every advertisement for joysticks and interfaces in your magazine I would like to know which is the best to buy.

Chris Wilcox,
London NW6.

● *The 1985 Sinclair User Annual has an up-to-date round-up of the best joysticks and interfaces manufactured during the last year.*

Protective software

THERE WAS an article in the September edition of *Sinclair User* about how to protect your programs from software pirates. The article showed several ways of doing that for the Spectrum including making a line with the number 0.

For ZX-81 users who would like to do the same, type in a line (e.g. 10 REM COPYRIGHT) and press NEWLINE; Type in POKE 16510,0 and NEWLINE; Press NEWLINE again and you will see '0 REM COPYRIGHT.'

That line cannot be edited and cannot be erased by typing in 0 and then NEWLINE.

Andrew Fox,
Ipswich, Suffolk.

Sabre Wulf king deposed

I WOULD just like to say, in reply to Des Claypole's letter in the November edition of your excellent *Sinclair User*, that he has now abdicated. He claims himself to be the **Sabre Wulf** king but I finished on an earlier date than June 7 on the very day that I bought the game. I considered it so simple that it wasn't worth writing in about. So I now claim to be the mega-supreme Sabre Wulf emperor.

R Worden,
Preston,
Lancashire.

Clamp down on pirates

I READ with interest the letter from Mr Dickinson — November, *Sinclair User* — who mentioned how he had to clamp down on the abuse of his school Spectrums for tape-copying.

There can be no doubt that a great deal of piracy goes on under the aegis of schools, and that some-called computer clubs are little more than mutual copying circles. That is not only a disaster for the software business; it is an educational catastrophe too, as witness the letter on the same page from Colin Baxter who can see nothing wrong with making a copy of a tape which he cannot afford to buy. That can only be because he has not been taught to.

What happens outside the school is not the school's concern, but it is the responsibility of the schools, as much as of parents, to teach computer-owning youngsters not to steal copyright work, and if they do not computers will do more harm than good to those who are given them.

Andrew Turek,
London NW11.

Beat Daley's world record

My friend and I have recently bought **Daley Thompson's Decathlon.** We played for 1 hour 45 minutes non-stop, and reached the final score of 1,181,160, and cleared 27 sheets containing five events in each sheet on day one.

Kirk Green,
aged 14,
Paul Bush,
aged 15,
Ilford, Essex.

Sick CUBs recalled

CALLING all CUB QL-compatible users.

A supplier's component fault is suspected on model numbers 1451/DQ/3 and 1451/MQ/3 with serial numbers between 85692 and 103317.

To enable us to rectify the situation, therefore, I should be grateful if readers with such models telephone David Kaye on Bradford 726500 so that we can make arrangements for the collection of their monitors for the necessary up-grading to be carried out.

The cost of this operation will be borne by Microvitec PLC.

Tony Fall,
Marketing Manager,
Microvitec.

more letters on page 20

Getting the printer blues

I HAVE just spent a day in Exeter unsuccessfully trying to buy a printer for my Spectrum.

I was told that the ZX printer is no longer available: "We don't stock them any more, they gave us too much trouble."

I found that the Alphacom 32 had leapt up in price by £20 or so. "That happened when the ZX printer was withdrawn."

No supplier could show me a printout in black ink on white paper.

No supplier had a printer linked up to a computer so that I could see it working. As the blue printout as seen was not good enough, and the black ink was not to be seen, I came away without a printer.

I think that shops are taking a casual view of the customer, riding on the crest of a wave of sales. Maybe they feel that there is no need to bother with demonstrations. Considering the price of even the cheapest printer, it seems odd that they don't make a bit more effort, shoe shops take a lot more trouble to sell a much less expensive product.

Bill Robinson,
Dawlish,
Devon.

Printing at midnight

I AM writing to say how I feel about the Beyond Software **Lords of Midnight** competition. I for one can complete the game but have no printer, and cannot enter. It annoys me greatly that a printer is necessary to enter the competition because it means spending more than the £9.95 that the game costs.

Gareth Layzell,
Stanmore,
Middlesex.

● *Many readers have complaints of a similar nature. Beyond Software be warned!*

Fanfare for the ZX-81

RICHARD Brooker — November — is right to ask for more ZX-81 cover in *Sinclair User*. I believe it is important that you do more for users of this excellent little computer — and always bear in mind that it is still selling.

Furthermore I would like to make a point about your software reviews. It could be that you underate some of the programs for ZX-81 thereby dissuading potential buyers. For example, I thoroughly enjoy playing **Racing League,** a strategic game concerning the Sport of Kings. Your review said the game was 'slow'. Even the highly successful **Football Manager** — Gilbert Factor only 7! — is slow on the ZX-81 but it remains a great game!

T G Bell, Winlaton,
Tyne and Wear.

● *Racing League was described as slow because the bulk of it was written in Basic, not machine code.*

Speechless Spectrums

I RECENTLY made a speech synthesiser unit which operates quite well on my 48K Spectrum. Unfortunately, it suffers from a limited vocabulary. It operates on the Allophone system from the SP0256-AL2.

I would appreciate information on how I may obtain words together with their Allophone equivalents from other readers.

Declan Grady,
Cullion Road,
Letterkenny, Co. Donegal.

C64 slips past censors?

I FEEL that I must write and express my deep disappointment and annoyance at finding a Commodore advertisement in the October issue. It may have escaped your notice but your magazine is called *Sinclair User!*

If you keep this up you will have lost one loyal customer.

J S Shaw, Blackfield,
Southampton.

● *Rob Cameron, advertisement manager replies: In the long run it is product quality and service which counts and if Sinclair's rivals feel they can do better who are we to censor them from saying so?*

50 of the best?

YOUR TOP 50 Software Classics — November, *Sinclair User* — is a classic example of the way your magazine seems to be heading. One war game mentioned, no management or strategy games that I could see. I know you have reviewed such games as **Conquest** and **Fall of Rome** but can you do more?

Peter J Beard,
Market Rasen,
Lincolnshire.

I MUST congratulate you on your excellent magazine, it goes from strength to strength. November's issue must have been the largest yet and the top 50 games booklet was a great bonus. However, I was amazed that **Scuba Diver** by Durrell wasn't included. It has to be one of the most addictive and graphically superior games around.

John Meads,
Rainham,
Kent.

Programming for more cash

A FEW errors have crept into program listings of late, for which we do apologise. **Domewars,** in the November issue, should be amended as follows:

Line 340 should read: PRINT AT 19,3; INK 6;"*"; INK 5;"+";AT 20,3; INK 7;"."; INK 3;"/"

We should also point that the program does not use User-defined Graphics in the conventional sense, but changes the character set instead. That appears to have confused some readers.

Home Accounts in the November issue is lacking a few lines of the last DATA statement. It should read:

```
9800 DATA
"a",10,"b",1000,
"c",2000,"d",3000,
"e",8900,"f",8950,
"g",8980,"h",8990,
"A",10,"B",1000,
"C",2000,"D",3000,
"E",8900,"F",8950,
"G",8980,"H",8990.
```

In Home Accounts, the bank statement section is there purely for reference and will not be used by the monthly forecast.

Finally, **The Right Stuff** in the October issue also suffered from gremlins. Make the following amendments:

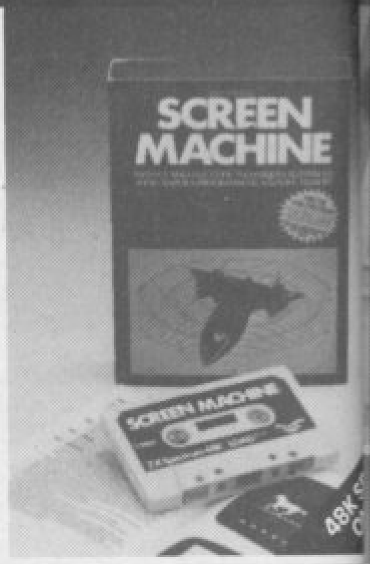
```
1 GOTO 500
479 IF q hi THEN GO TO
    9301
507 RUN 600
630 FOR f=0 TO 7
9234 LET q=hi
```

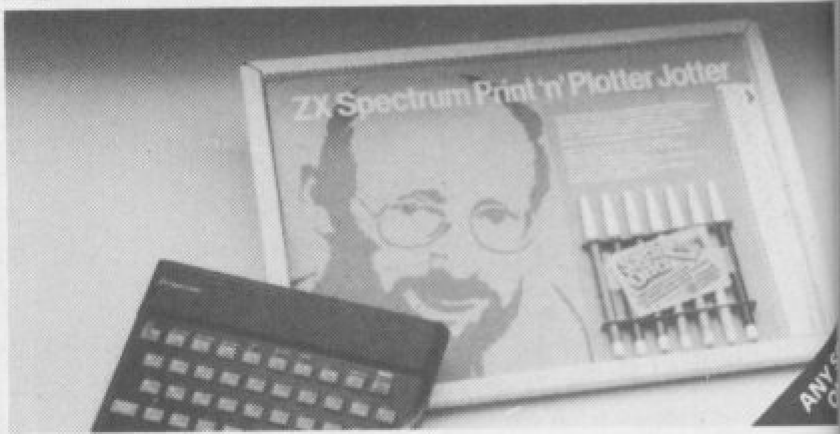
Now for the good news. From now on we shall be paying £20 for each program published, and £50 for star programs. Details of how to send programs can be found on the Contents page. Please make sure that your programs are accompanied by a letter describing the game, your name and address, and a cassette or cartridge containing the program.

We try our best to send back programs we cannot publish as quickly as possible, and will make special efforts with cartridges.

HERE'S SIX WAYS T







PAINTBOX

Superb Graphics — without expensive hardware!

PAINTBOX is a must for every owner of a 48K Spectrum.

It will give you the ability to produce stunning graphics on your micro — simply.

With PAINTBOX there's no need for expensive hardware — why pay up to £150 for hardware when you can produce incredible picture and graphics with one cassette-based software package?

If you haven't seen PAINTBOX demonstrated you're in for a pleasant surprise!

For instance, PAINTBOX will enable you to draw practically anything on your screen and save it either as SCREEN$ or as a machine code memory file to use in your BASIC or MC programs.

You wield enormous power over the graphics capability of your SPECTRUM — including the definition, storage and use of up to 84 UDG's — 4 times more than normal! A brief description of facilities are as follows:

UDG DRAWING BOARD for defining up to 4 Banks of UDG's including ROTATE, MIRROR, INVERSE etc.

UDG EDITOR for storing up to 84 UDG's for use in screen planning or in your other programs.

PRECISION PLOTTER. A high-resolution drawing board which allows you to draw anything on the screen. Facilities like CIRCLE, FILL, ARC, PLOT, DRAW, ERASE, OVER, DRAW RADIALLY, INK, BRIGHT etc are included and easy to use!

SCREEN PLANNER gives you the best of both worlds! The combined use of PRECISION PLOTTER and your Banks of UDG's for highly detailed and precise screen graphics.

The program is complete with DEMO on side two of the cassette and a 28 page instruction booklet.

PAINTBOX can be used with Joysticks and is Sinclair Microdrive compatible.

SCREEN MACHINE

Instant Machine Code for graphics and text

SCREEN MACHINE is a completely professional graphics utility to use with Paintbox (or any other graphics hardware or software).

It will allow you to manipulate your screen graphics and text in ways which will make your programs better and more memory efficient. For instance:

If you have produced a screen-full of superb graphics you can enlarge, reduce, recolour, flip screen, relocate your graphics to another part of the screen, superimpose one screen on another and perform all sorts of other wonders!

Then you can take your results and put them through a series of memory compression routines to allow you to save enormous amounts of memory. Such items like compressing with or without attributes, saving thirds of the screen and multiple combinations of both are possible.

Never has machine code storage of graphics been simpler because SCREEN MACHINE automatically creates re-callable multiple screen files with a location catalogue so that you can add them to your programs!

SCREEN MACHINE also allows the user to program UDG's or text directly into machine code, so if your programs use a lot of text instructions or menus SCREEN MACHINE is going to save fantastic amounts of memory!

SCREEN MACHINE is a major graphics toolkit for the 48K SPECTRUM. It is completely menu-driven, Sinclair Microdrive compatible, and comes with instruction book and an unbelievable DEMO on side 2 of the cassette.

ADVENTURE PLANNER

A must for the adventure game fan

If you're an Adventure Game nut, Print 'n' Plotter's new ADVENTURE PLANNER is exactly what you have been looking for!

It's a 50 page, BIG SIZE (16¾" x 11¾") pad with a complete 'mapping' system with over 150 locations on each sheet . . . created to help you solve Adventure Games.

It's the best way to beat the 'system' and is obviously for use with any make of computer.

ADVENTURE PLANNER will also assist you in planning Adventure Games for programming — a helpful pad to keep by your computer at all times.

S TO IMPROVE PROGRAMS.





ADVENTURE PLANNER is published with instructions for use, examples, hints and tips on how to play and win the game faster.

ADVENTURE PLANNER is a high quality pad, board-backed and fly-leaf cover . . . economically priced too!

ZX SPECTRUM JOTTER

Pre-planning your screen made easy . . . and precise!

Print 'n' Plotter JOTTERS have become a household word for the Sinclair enthusiast.

Despite various imitations our original ZX SPECTRUM JOTTER is still the one people prefer!

Of course it could be because it is professionally produced . . . the quality is superb.

And the fact that it is BIG SIZE A3 (16½" x 11¾") is a distinct advantage when working in high-resolution.

It's also 100 pages thick. 50 pages of PLOT grids showing each numbered pixel co-ordinate and 50 pages of PRINT grids showing every character and graphic character position and INPUT lines.

Each page also contains 24 UDG planning grids (2400 per pad).

Consider also the fact that it is printed on Artist's Detail paper . . . thick enough to take any writing, drawing or colouring, yet thin enough to overlay onto a drawing and trace-off.

For pre-planning graphics, text, tabulation or anything to produce 'on screen', a Print 'n' Plotter JOTTER won't be beaten.

The complete package comes with a set of coloured pens, a Pixel ruler and a handy corrugated storage tray.

If you use PAINTBOX, SCREEN MACHINE or any other graphics utility . . . you'll do things better with the ORIGINAL Print 'n' Plotter JOTTER!

KEYBOARD OVERLAYS

The simple answer to "Which key?"

Print 'n' Plotter KEYBOARD OVERLAYS for the standard ZX Spectrum keyboard are the economic answer to "Which key does what?"

If you program, or buy commercially-produced software, sooner or later you'll be faced with a mind-boggling mass of keys that perform different functions.

Let's face it, the Spectrum keyboard is complicated enough so why not take the easy way to remember . . .

. . . lay over the keyboard a Print 'n' Plotter OVERLAY and write the function underneath . . . it's child's play!

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S12

Transparently tacky

THE replacement keyboard for the Spectrum from Kappa Keyboards is a curious mixture of new and old ideas. It uses a style of key that was popular among DIY enthusiasts a few years ago and yet it has 14 single key functions, a recent innovation in keyboard design.

The keycaps are of transparent plastic and you are supplied with a sheet of paper on which the legends are printed. That has to be cut up and the legends placed under the caps.

The extra single key functions are Edit, Delete, Comma, Full Stop, Dollar, Times, Graphics Mode and Caps Lock which toggle on and off, four shifted Cursor keys and True and Inverse Video. The last six are particularly useful with **Tasword II,** using the cursor keys to move around the text and the video keys to move one word at a time — an idea reproduced on the new Spectrum+. In addition there are extra Caps Shift and Symbol Shift keys, but, there is no E Mode key, a major omission.



It is supplied as a replacement for the top half of the Spectrum. You remove the five screws holding the Spectrum together, disconnect the keyboard leads, insert the new leads and screw the case back together. The new leads are, unusually, ribbon cable with half the insulation removed, and so they will not stand repeated insertion.

With all the extra keys and the limited space available the keyboard is very cramped. Despite that Kappa still manages to find space to bring the Address and Data lines to the top of the keyboard via two IC sockets placed either side of the keys. The company sells an additional adapter which converts them to take a joystick. The left hand socket simulates 1, 2, 3, 4 and 5 and the right hand one 6, 7, 8, 9 and 0, as used on Interface 2.

For £48.00 the keyboard has much to offer in faciliites but it falls down badly in key layout, feel and looks. If it used better keys and was housed in a bigger case then it would be one of the best keyboards on the market.

There may be, however, a solution to the problem. Kappa can also supply a small electrical package at £14.00 to which you can wire your own keys. That allows you to have functions which normally require a shift key to be replaced by a single key.

Further details of those products can be obtained from Kappa Keyboards, 14 Pauls Mead, Portland, Dorset DT5 1JZ.

New COPY causes corruption

A NEW full-sized Centronics printer interface for the Spectrum has been launched by Cambridge Microelectronics Ltd. Called the Print-SP it allows the user to redirect the LPRINT and LLIST commands to the printer or to copy the screen.

As with many of the popular printer interfaces the software needed to run it is supplied on tape. That sits in the now unused printer buffer which has the advantage that it is compatible with software which uses memory above RAMTOP. It also has the disadvantage that NEW or COPY will delete it.

The software can be configured to give up to 80 characters per line and to give an automatic Line Feed (LF) after a Carriage Return (CR). The COPY routine can be configured for the Epson and Seikosha 100/250 types of printer and is called by a RAND USR call.

Also supplied on the tape is a text processor program called SPWRITE. This is a Basic program which effectively DIMs an array of up to 500 by 64 characters and then allows you to fill each element.

On the plus side the interface is inexpensive at £31.25 including cable and, due to the case design, is easily fitted to a full-sized keyboard. However, it does not have a through connector for other add-ons and there are many programs, such as **Tasword II,** which use the printer buffer making it incompatible. If Camel was to include software which sat above RAMTOP and dispensed with SPWRITE, which is of limited use then the interface would be a good buy. As it stands there is little to set it apart from the others on the market.

The Print-SP is available from Cambridge Microelectronics Ltd, One Milton Road, Cambridge CB4 1UY.



Spectrum switch

THE BEST things arrive in small packages and the Spectrum Switch from TEC is one of the smallest pieces of hardware we have had to review. It is an on/off switch which fits into the power socket of the Spectrum. The lead from the power supply plugs into the back, and there is a small rocker switch on the front. The unit is held in place by double sided tape.

It is a good idea to have some form of switch on the power supply as repeatedly pulling the plug will eventually weaken the socket. The Spectrum Switch is pleasantly styled and, provided the Spectrum is still in the original case, a useful addition.

The only problem is the price. While the cost of the component parts is reflected in the price of £4.95, if you are able to use a screwdriver you could add your own inline switch for a fraction of the price. If you would rather take the easy way out the Switch is available from TEC, 24 Victoria Road, Bromsgrove, Worcs.

more hardware on page 27

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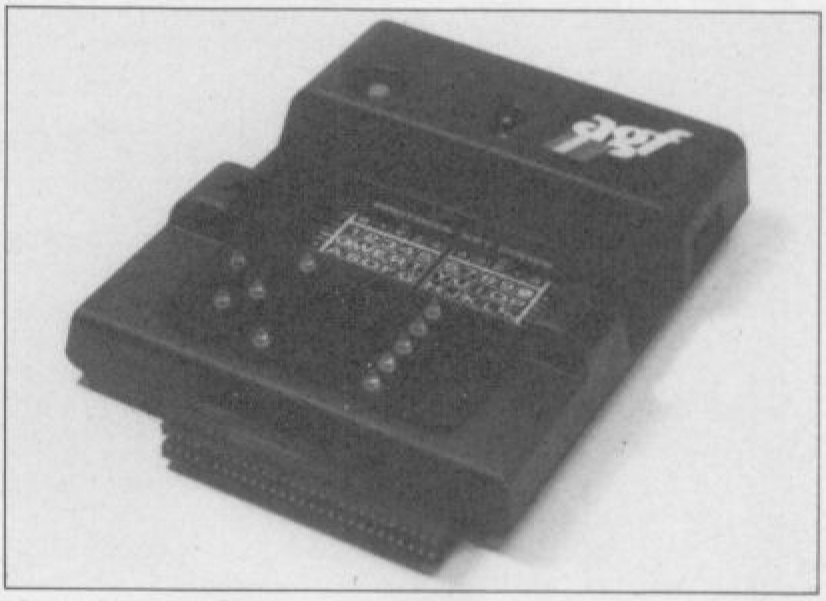
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Compatibility cure

AFTER a slight hiccup AGF has now relaunched its Protocol 4 progammable joystick interface for the Spectrum. The original version was not compatible with all Kempston compatible games but that has now been cured.

A novel method is used to program the interface. You are supplied with five small plastic cards, four of which are already set up. Those cards contain a series of holes which represent the Address and Data lines as used by the Spectrum keyboard. Small rubberised pads are then inserted in the holes, one per line per key, according to a chart supplied, until the four directions, and fire, have been programmed.

The card is then inserted in the interface so that the rubber pads press down in a membrane, similar to that used on the Spectrum keyboard. The four preprogrammed cards simulate the 5, 6, 7, 8 and 0 keys, the 1, 2, 3, 4 and 5 or 6, 7, 8, 9 and 0 Interface 2 keys. The remaining card simulates the Kempston standard.



That process may appear rather complicated but it only has to be done once. AGF supply ten reference cards on which you can note the positions of the rubber pads and can supply additional plastic cards so you can keep a stock of preprogrammable cards. The cards can be changed while a program is running, if you are careful not to joggle the interface, and the keyboard is not disabled.

On the pre-production version tested, the expansion port had not been carried through to the back of the interface, but AGF plans to do that on later models. It did have a useful reset button on the top of the interface and the ability to use joysticks with the Auto-Rapid Fire feature.

There are, however, some reservations about the interface. A membrane has a limited life. Also the cards sometimes fail to locate properly so that only two of the four directions worked. That could be cured by being heavy-handed when inserting them but should not be necessary. The greatest problem is the speed of response. When the keyboard is simulated there is a delay between moving the stick and something happening. When playing a game that could mean the difference between getting zapped or living to fight another day.

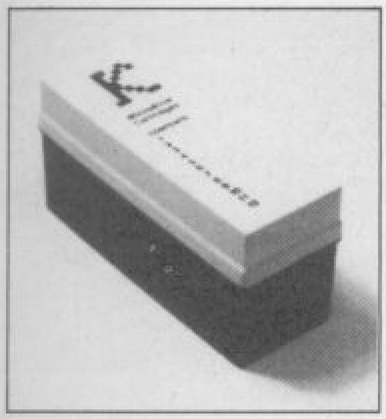
Overall, the interface has much to offer but fails to deliver. For more details contact AGF, 26 Van Gogh Place, Bognor Regis, West Sussex PO22 9BY.

Boxing clever

REGULAR readers of the computer press may remember a bright idea sent in by a reader some time ago for storing microdrive cartridges. He suggested that some types of photographic slide boxes were just the right size to hold a dozen cartridges.

Not the sort of people to let a good idea go to waste, Kappa Keyboards, whose address is given elsewhere in Hardware World, obtained some slide boxes, printed its logo and an index on the top, and the Kappa Keyboards Cartridge Box was born. For £0.99 you get just that — a slide box with a printed lid.

If, however, you do not want the printing and only want to spend a fraction of that amount then contact your nearest photographic stockist.



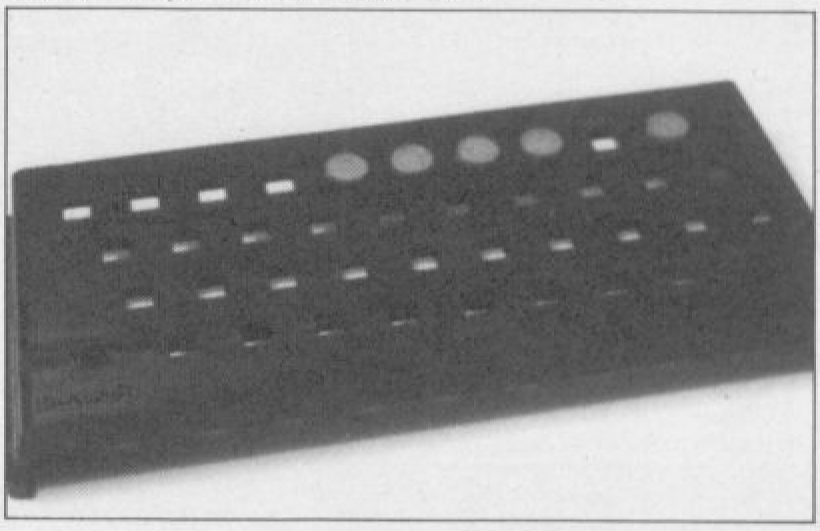
Plug for memory pegs

ONE of the more unusual add-ons for the Spectrum is the Games Board from Marvic Marketing. This is a well made plastic cover which neatly clips over the keyboard with holes over all the keys. Pegs can then be inserted in the holes which, when pressed, press down on the key underneath.

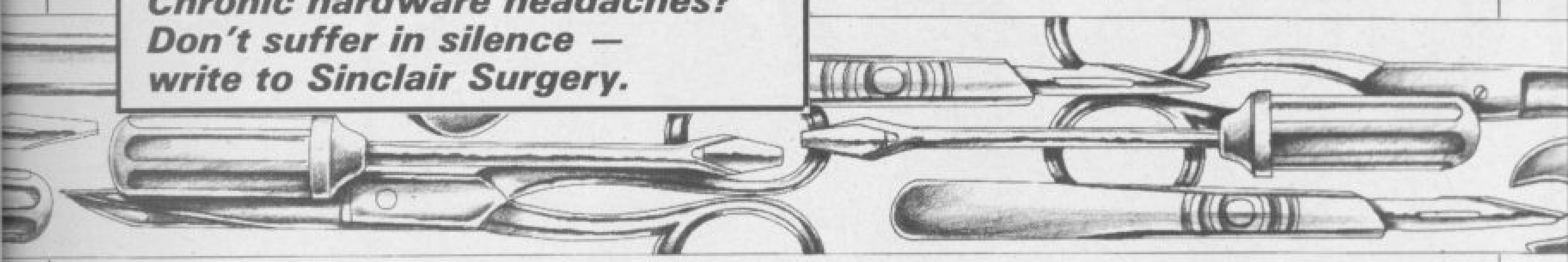
The idea behind it is that if you put pegs over the only keys you need to play a particular game then you cannot inadvertently press the incorrect key, or forget which keys you are supposed to be using. To help you in that you are also supplied with sticky labels to put on the pegs with such useful legends as Bomb, Laser, Start, Pause, Hyper and Fire as well as a number of arrows to indicate direction.

If you are completely absent-minded then this is the add-on for you. If not then save your money and buy a joystick.

The Games Board is priced at £9.95, from Marvic Marketing, Arndale Centre, Stretford, Manchester M32 9BB.



Acute add-on allergy? Chronic hardware headaches? Don't suffer in silence — write to Sinclair Surgery.



Readers' feedback on crash prevention

THE OCTOBER issue of Sinclair Surgery provoked a number of readers to write in with useful hints. Most concerned ways of stopping the computer crashing if an add-on was joggled. Charles Rowbottom of Arnside, Cumbria suggested cleaning the edge connector with Switch Cleaning Fluid, while W R Corbett of Wigan had a useful POKE for Spectrum owners. He believes crashing is caused by the NMI line being disturbed which can be cured by POKE 23728,1. That is a new one to us but if it works then the best of luck to you.

Charles also pointed out that a Stereo tape deck can be used provided that both channels are used for recording and playback. If you do this you must make sure that you do not leave the EAR lead in while saving otherwise the feedback could do nasty, expensive things to your deck.

If you have any comments regarding our replies or tips of your own then let us know. You could save someone a few sleepless nights.

Sticky problems

I HAVE a complaint. Why do a lot of the Spectrum keyboards come away from the computer. That has happened to the computers of my friends and is beginning to happen to mine. What should I do about this?

David Lyall,
Moary, Scotland.

● *The part that is coming unstuck is simply the metal cover plate on which the legends are printed, which fits over the rubber key mat. That was a common problem with early Spectrums until, after a number of complaints, Sinclair changed the glue for one that did not melt due to the heat. The solution is to simply glue it back into place with a suitable glue.*

Racing wheels

CAN you answer a question concerning **Chequered Flag** from Psion? I have heard that a steering wheel was available with early copies to promote sales.

Carl Ritchie,
North Harrow,
Middlesex.

● *The only steering wheel we know of was produced by Spirit Software, 1 Pembroke Mews, London W8, in conjunction with its Formula One racing game. We have never seen one of those wheels but would be happy to hear from readers, or Spirit Software, if it is still available.*

Sickly sticks

I RECENTLY purchased a Ram Turbo Interface and a Quickshot II joystick. A problem has occurred. Frequently the joystick will not respond to upward movement; I usually have to adjust the joystick cable and sometimes it will work. I am unable to return both items as I purchased them in Boots in Liverpool.

Rory Canavan,
Bray, County Wicklow,
Ireland.

● *If something you have bought does not work then the only answer is to send it back. It should be possible to exchange it through your local branch of Boots.*

Continuous firing

OWNING a 48K Spectrum, I now wish to purchase the Quickshot II joystick with the auto-fire feature. I wonder if you could advise me on which programmable interface to buy as some of them crash if you use this joystick. I cannot afford more than £30.00.

Mark Wright,
Rugby,
Warwickshire.

● *This month in Hardware World we review the AGF Protocol 4 joystick interface. As far as we know that is the only interface which allows you to use the features of a standard Auto-Fire joystick and is priced at £29.95.*

Solder onwards

STEPHEN Neal, November Sinclair Surgery, had a problem with his keyboard. The information you gave to him was correct, but it was not practical. I would bet that the problem lies in the cheap ribbon cable in the Spectrum. I can't really see the matrix giving up the ghost, not unless the user is hamfisted.

If you're handy with a soldering iron read on.

Carefully open the Spectrum to reveal the ribbon cables. Pull them out of the sockets. Unscrew the circuit board from the base.

With a suitable desoldering tool take out one of the two ribbon cable sockets. Solder one end of a new piece of flexible ribbon cable into the circuit board at the same place where the socket came from. Then solder the socket to the other end of the ribbon cable.

With a pair of scissors, cut back the original cable so there is a kink-free length of cable to slide into the socket.

Do the same thing to the other cable if needed if not, make sure that there are no shorts when the computer is put together again.

Wasn't that nice and simple?

Brian St Rose,
Ilford,
Essex.

● *This is correct if you know what you are doing but we would not recommend that a novice attempt to solder anything to the Spectrum circuit board.*

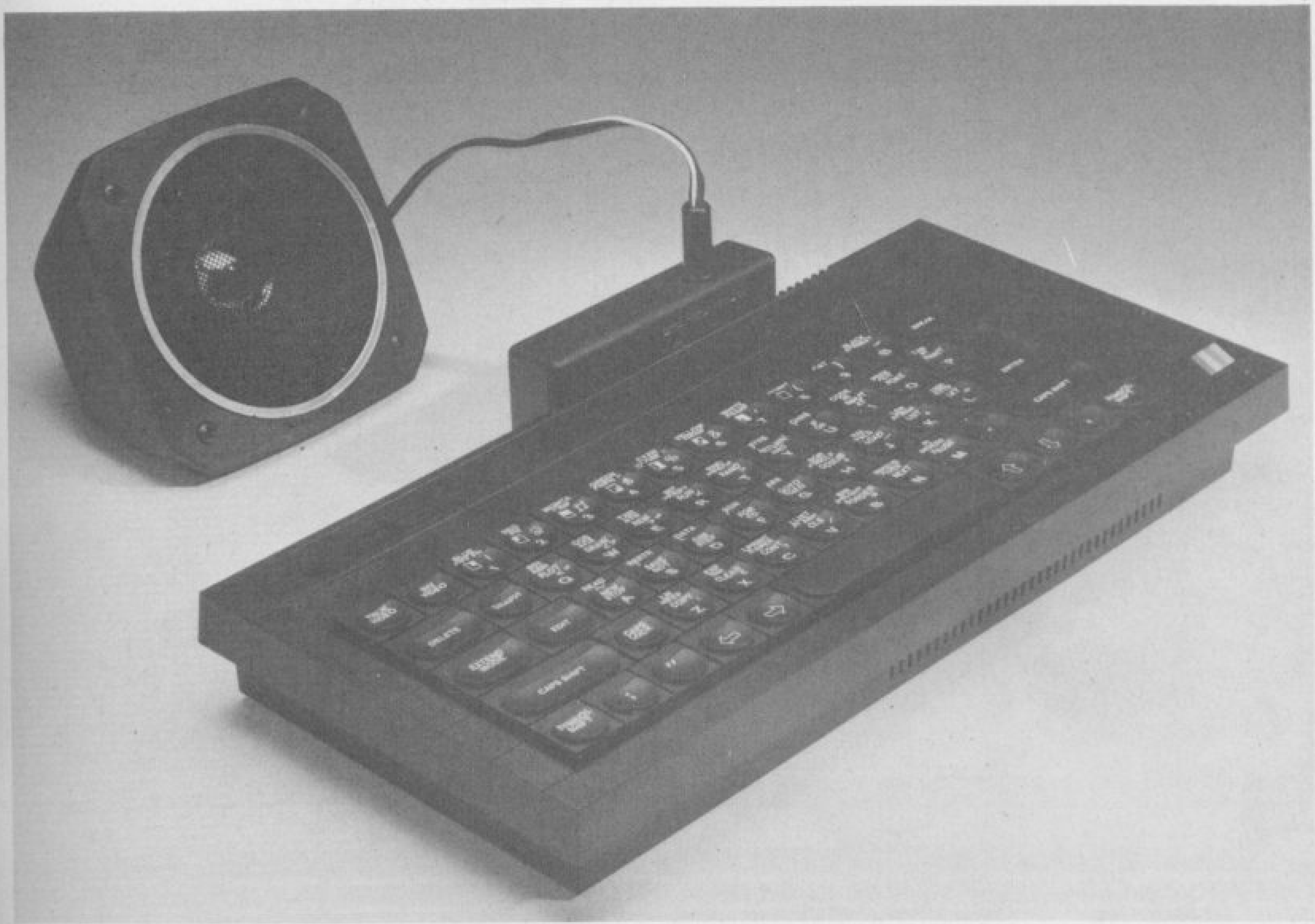
Addressing bytes

WITH reference to your November issue I was a little surprised to read the advice you gave to D Williams and to Carl Williams concerning their problems as I would have thought that the cause of D Williams' problem, in particular, was pretty obvious. He or she was trying to dimension a numeric array, A(4000) on a ZX-81 with a 16K Rampack. Numeric variables — as nearly every schoolboy knows — require five bytes for each address in the array. Thus 4000=20K which will not go into any 16K RAM.

I regret that the advice which you gave Carl Williams was also slightly adrift. A file can be moved directly from one microdrive to another using the MOVE command.

John Hale,
Newport Pagnell,
Buckinghamshire.

Spectrum Speech Synthesizer!

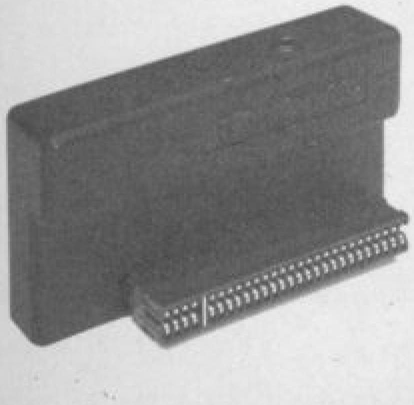


The dk'tronics synthesizer, like all their other peripherals is both Spectrum & Spectrum plus compatible, it uses the popular SLO/256 speech chip and has an almost infinite vocabulary. It is supplied with a text to speech converter for ease of speech output creation. Everything you wish to be spoken is entered in normal English, without special control codes or characters, it is therefore extremely easy to use. The voicing of the words is completely user transparent and the computer can carry on its normal running of a program while the speech chip is talking.

Although there are only 26 letters in the alphabet, letters have a totally different sound when used in different words. For example, The "a" in Hay is much longer and softer than in Hat. When you speak you automatically make adjustments because you know just how a word should sound. Not quite so easy with a computer. After looking at other speech synthesizers we decided that it was essential that the dk'tronics Spectrum Speech would offer a simple system that would enable the user to produce realistic speech that was instantly recognisable.

The solution to the problem was extremely complicated, it required hours of programming to enable the computer to look at the individual letters that make up each word and compare there relative position to each other before deciding on the appropriate sound.

I am delighted that we have now perfected what I consider to be the best Spectrum Speech Synthesizer on the market, one which has achieved my aim, within the limitations of the allophones, of producing realistic speech.



At **only £24.95** the dk'tronics speech synthesizer represents remarkable value for money. Naturally it is compatible with their other peripherals which can be used via the rear through connector.

Available from department stores and good computer shops everywhere or direct from

dk'tronics, Saffron Walden, Essex CB11 3AQ. 1SU Tel. (0799) 26350 add £1.25 post and packing.

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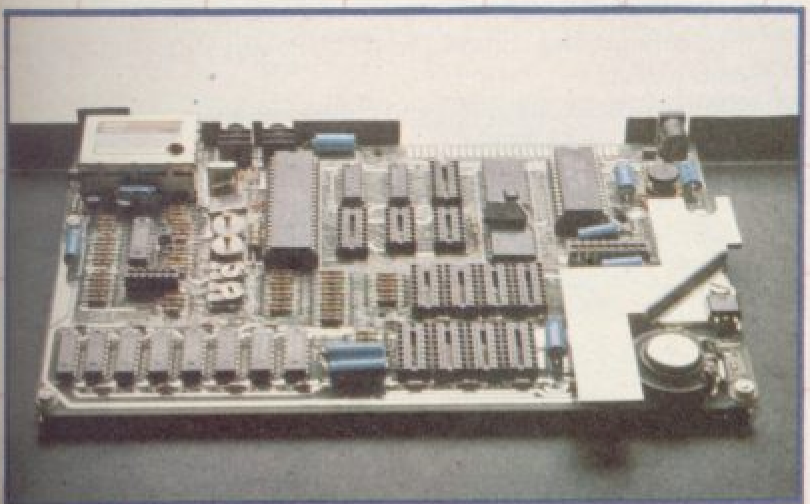
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SU 1 85



Here comes the chopper!

THE VIOLENT scenario of **TLL** has been replaced by an altogether more humanitarian mission in the sequel, **Cyclone.** Rather than provide you with a swing-wing Tornado, Vortex has obtained a nippy little helicopter, and your task is not to bomb the bases but collect vital medical supplies in the face of a colossal hurricane.

The playing area is large, an expanse of ocean dotted with islands which are being evacuated. A map option shows the overall picture, and charts the centre of the cyclone, which can move around with frightening speed.

While the graphics are based firmly on the very successful TLL, with 3D-style landscapes and small houses, they are not as pleasing to the eye. The game has several new factors which, however, more than make up for the deficiency.

There is more animation; villagers on the islands wave at you, and the helicopter has a hook and line with which to winch up the crates of supplies. The rugged terrain of the islands may cause you to crash, but far more dangerous are the other aircraft on the flight lanes between the islands, and the cyclone itself. While producing no apparent effect on the landscape, if you stray too close to the epicentre it will buffet you this way and that. You will be lucky to escape with your life, let alone with sufficient fuel to make it to a landing pad.

An extra bonus is the option to view the landscape from both North and South. The crates of supplies will only be visible from one direction, so you must explore the coastline carefully to find the boxes. The minute danger threatens it is all too easy to forget which way you are heading and fly straight into the eye of the storm.

While offering less opportunity for flashy aerobatics than its predecessor, Cyclone presents more problems and is more satisfying to play. The graphics are still effective, if less complex, and the concept of battling against the weather as well as your own cackhandedness is novel and welcome. *Chris Bourne*

CYCLONE
Memory: **48K**
Price: **£6.95**
Joystick: **Sinclair, Kempston, Protek**
Gilbert factor: **8**

Eysenck, the shrink

PROFESSOR Hans Eysenck is one of the gurus of modern psychology, renowned for outspoken and often controversial views on the nature of human thought.

His recent book of personality tests, published by Penguin, became a minor bestseller, and the tests have now been released in the form of a computer program.

It must be emphasised that the tests are not supposed to have any clinical value, but are simply an entertaining questionnaire of the type that appears in glossy magazines, but glorified by the authority of the good professor.

The questions include all the things that you might expect, such as 'Have you ever wished you were dead?' or 'Do you feel you are a failure?'. In amongst these depressing interrogations are more intriguing queries, such as 'Do you eat your meals faster than everybody else?' or 'Would you like to watch a pornographic movie?'

Each test comprises about 200 questions. There is a facility to SAVE the data from each completed test so as to produce a grand display of all your faults and virtues in one soul-destroying blitz.

Taken as entertainment, which is Mirrorsoft's purpose in releasing the program, **Know Your Own Personality** is good enough fun. One should not, however, believe everything the program says. Eysenck may be a leading authority, but even he cannot be expected to get it right with a silicon cushion between him and his patient. *Chris Bourne*

KNOW YOUR OWN PERSONALITY
Memory: **48K**
Price: **£9.95**
Gilbert Factor: **6**

On a level with Ted

CHIPS, chips, everywhere and not a bite to eat. After all, who wants to eat the silicon variety?

Hewson Consultants obviously believe someone might like a byte and have launched **Technician Ted.** It is yet another platform game bearing startling similarities to **Jet Set Willy.**

You play the part of Ted in a silicon chip factory. It is a massive place and to get his meal of chips, Ted has to complete various tasks allowing him to pick up a glass, knife and fork and so on.

The graphics are highly coloured and scroll smoothly — transition from one screen to another is well oiled! Ted almost waltzes round the factory to the *Blue Danube,* a rousing number even when played on the Spectrum.

Technician Ted is guaranteed to keep avid arcade adventurers happy for a few days. However, if you prefer something with more zap, don't go anywhere near the silicon factory. *Clare Edgeley*

TECHNICIAN TED
Memory: **48K**
Price: **£5.95**
Joystick: **Sinclair, Kempston**
Gilbert factor: **7**

Time for bed, said Zebedee

IN **The Magic Roundabout,** from CRL, Dougal and the gang are still playing happily in the Magic Garden where Dougal's aim is to build a house of sugar before bedtime. He has to collect lumps of sugar dotted around the garden and dump them at the Magic Mushroom — resembling a deformed flower — where a train will appear to transport them to his house.

Sprite characters make up the graphics and although they are a faithful copy of the original characters the movements are jerky and slow.

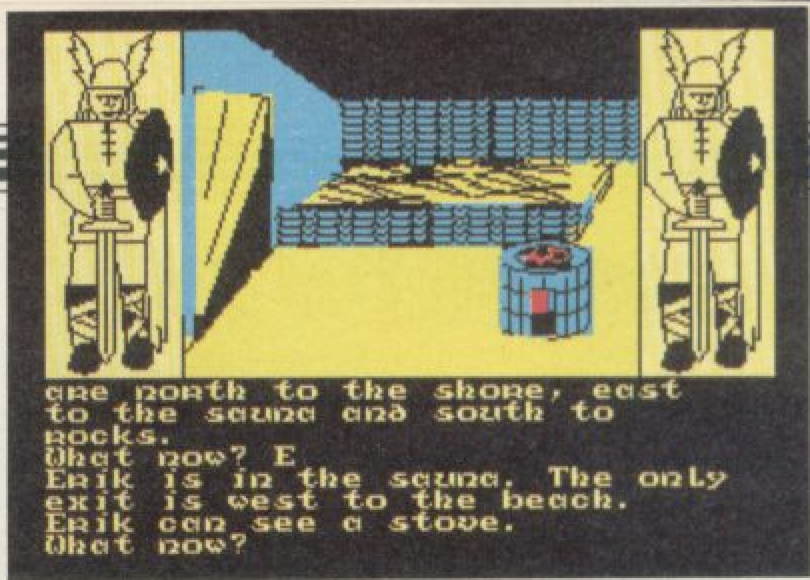
Not a game to start the adrenalin flowing — in fact it will continue to course sluggishly through your veins — it is great nevertheless to see that Dougal and friends are still around, even if they have been incarcerated in RAM for posterity. *Clare Edgeley*



MAGIC ROUNDABOUT
Memory: **48K**
Price: **£6.95**
Joystick: **Protek, Kempston, AGF**
Gilbert Factor: **5**

more software on page 38

The tales of Viking Eric



BASED on the book by Terry Jones, **Erik the Viking,** although published by Mosaic, has been programmed by Level 9. The adventure does not simply rehash the original but uses extracts from it to provide background and clues for a new saga.

Erik has settled down to become a prosperous farmer. While his sons go a-viking in the summers he prefers to sit by his hall fire and hear their tales. His contentment is short-lived and one day, as he snoozes under a tree out on his pastures, his farm is raided by strange creatures from the outlands. He wakes to find his family and wealth have been taken.

The game begins at this point and Erik's task is to get his ship and crew together and then head down the fjord to the open sea. Appalling danger and powerful magic await him.

The program is attractively presented and the location graphics are well made, giving a fair flavour of the period. They take a little time to draw but can be removed by entering 'words'. The scenario is imaginative and full of event. There are enchanters, goddesses, sea monsters and vicious enemies.

The puzzles appear to be quite complex, as we might expect from Level 9, and Erik's journey is full of choice and decision. Even setting off requires a lot of forward planning.

The interpreter does not seem to have suffered too badly from the space given over to graphics though there were times when it could have been more helpful. In general, though, Erik the Viking is entertaining, complex and very good to look at. Even with a few minor criticisms Level 9 games are well above the normal standard of most adventures and this one is no exception, a blend of heroic adventure and detective story. *Richard Price*

ERIK THE VIKING
Memory: **48K**
Price: **£9.95**
Gilbert Factor: **8**

The flight of the BMX biker

EDDIE KIDD may have found it a doddle jumping 14 buses but in **Jump Challenge** it is not so easy.

In the official Eddie Kidd version from Martech Games, you are given the chance to beat Eddie's world record jump — secure in the knowledge that every time you fail your bones remain intact.

Pedalling furiously on your BMX, you warm up with a gentle jump over a mere 18 oil drums. It is quite easy — complacency sets in.

On graduating to motor bikes there is a relatively small jump over eight cars for starters! If, as the instructions state, you land with your back wheel on the ramp you should be all right.

The game calls for a large combination of skill, luck and the ability to judge speeds and distances. The speedometer and rev counter are a help but the main idea of the game is to teach the player to 'get the feel' of the bike.

The position of the rider is critical during the flight as he controls the angle of the bike. Making him lean backwards or forwards alters the bike's trajectory so that a safe landing can be negotiated. You will need to put in a lot of practice to get it right.

The game is well written and includes all the elements of skill and coordination that make an exciting program. There is one irritating aspect. If you repeatedly fail to clear the eight car stage, the game will end and start again with the BMX warm-up. When you are itching to get Eddie into the air, that stage seems a waste of time. *Clare Edgeley*

JUMP CHALLENGE
Memory: **48K**
Price: **£6.95**
Joystick: **Not specified**
Gilbert Factor: **6**

At one with the elements

ZENJI is a strange game but one which has become a cult in the United States. It is an Activision import which has been hurriedly translated to the Spectrum.

In order to become a master you must rely on your intuition to feel the forces flowing through the game's maze. Your playing piece is a face which revolves as you move the joystick or the keypad defined on the keyboard.

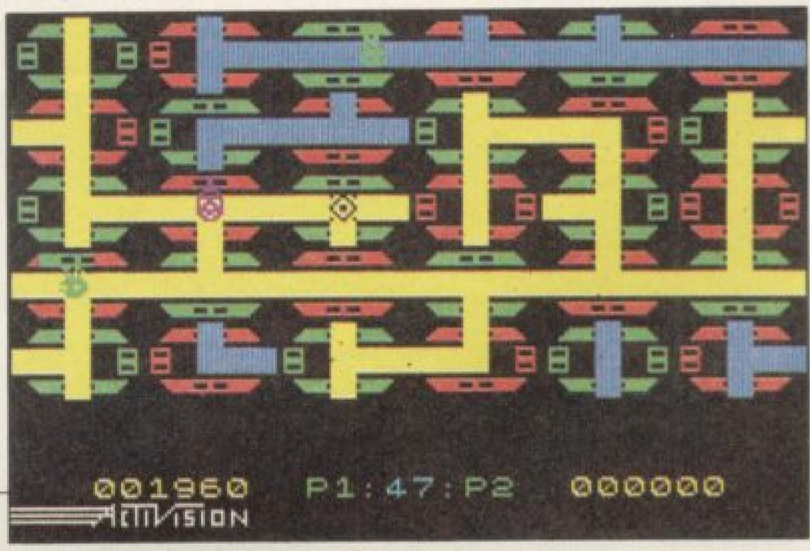
It starts at a central element and you must move it round the corridors and connect it to other elements which lie at the nodes of the corridors. If you hit a connection then a power wave is started between the original and new element and a link established. Part of the maze lights up with the radiance that those sources give off.

The higher levels of the game involves mazes which fill the whole screen and creatures which will only be too happy to feed on the energy that propels your character. If you bump into one then you will lose a life.

You will find that you will get better at the game and reach the higher levels but in **Zenji** experience is gained through insight and not mental reasoning. There is a way to beat the game at all its levels using logic but that spoils the excitement and we do not intend to reveal the answer.

Ultimately, Zenji is a test for two players. When you have enough mastery over the mazes then you should find a friend to pit your wits against.

John Gilbert



ZENJI
Memory: **48K**
Price: **£7.99**
Joystick: **Programmable, Sinclair, Kempston, Cursor**
Gilbert Factor: **8**

Bargains are bootyful

IN A BID to capitalise on the computer gaming scene, British Telecom has recently entered the market with their Silver range of games — priced at £2.50.

They are a mixed bag. BT's claim that the games are worthy of a five pound price tag seems to be applicable to only two of the games reviewed here. The remaining two would be expensive at any price over £2.50.

In **Booty,** you play the part of Jim the Cabin Boy who finds himself aboard the infamous pirate ship — the Black Galleon. One night while most of the pirates are sitting down to a steady drinking spree Jim creeps round the levels of the ship to steal their loot.

However, life is not always a game and Jim finds himself in the suds when he realises that not all the pirates are drunk — some have been left on guard. To get into their cabins, he has to steal the keys from under their noses.

The graphics are excellent with half the game portrayed in the increasingly popular style reminiscent of **Sabre Wulf** and **Pyjamarama.**

Viking Raiders is a different kettle of fish. It is a strategy game set amongst warfaring vikings back in the days of King Canute.

There are four armies, each headed by a Viking chief. The aim is to defeat the other three armies and become victor and ruler of the area. Dirty tricks abound and your catapults can be used to devastating effect.

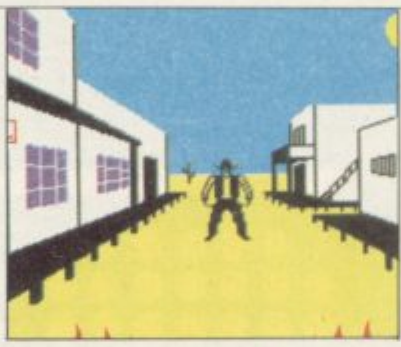
The graphics are sparse and basic. Each army takes a different colour which is hard on the eyes. Bright blues, pinks and greens may look nice in the programmer's imagination but they look terrible to the player who has to squint to see what is going on. However, there is enough appeal in the game to detract from these basic graphics.

The remaining two games are **The Wild Bunch** and **Exodus.** The Wild Bunch is an adventure set in the wild west. Framed for a murder you didn't commit, you are out to nail the Wild Bunch. The game resembles a superior multiple choice with a selection of options given to you at every move.

Adventures written in that style are rarely as exciting as those written in the more conventional mode — they rapidly become tedious. Billed as a graphical adventure, The Wild Bunch has a few scenes dotted around the adventure which are well depicted. For the most part though it appears to be mostly text.

Exodus is your average arcade game packed with characters cloned from other games. Mutant llamas abound, hovver mowers, galleons and TV sets lurk and assorted aliens merely wait to get you. The game lacks excitement, the graphics flicker and the sound is fairly average.

Clare Edgeley

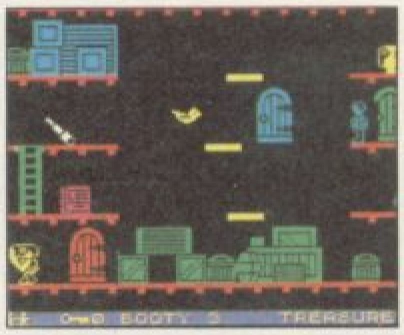


BOOTY
Memory: **48K**
Price: **£2.50**
Joystick: **Kempston, Sinclair, Programmable**
Gilbert Factor: **7**

VIKING RAIDERS
Memory: **48K**
Price: **£2.50**
Gilbert Factor: **6**

THE WILD BUNCH
Memory: **48K**
Price: **£2.50**
Gilbert Factor: **5**

EXODUS
Memory: **48K**
Price: **£2.50**
Joystick: **Cursor, Kempston**
Gilbert Factor: **3**



Bikers out of control

ONCE they have fathomed how to choose the game control options budding BMX star-warriors should have a pretty good time with **Starbike,** a fast arcade production from The Edge.

You must steer your starbike across the planet's surface to rescue friendly droids and return them to the safety of your lander module via a teleport located in your sector.

Large numbers of hostile alien objects swarm over the screen and will eventually wear out your shields and send you to wherever it is deceased BMX star-warriors are supposed to spend eternity.

There are a number of control options and you can choose from several joysticks, the Fuller Master Unit, Interface 2 and Currah microspeech. Working out how to select those requires a couple of A Levels.

It may take you some time to get used to the thrust controls but, all told, the game is exciting and quite addictive.

Richard Price

STARBIKE
Memory: **48K**
Price: **£6.95**
Joystick: **Kempston, Fuller, Protek, Sinclair**
Gilbert Factor: **6**

Under starter's orders

AS A RESULT of the tremendous success of Track & Field in the arcades in this, the Olympic year, a number of companies have jumped on the bandwagon to produce clones for all micros.

The latest to enter the great race is Melbourne House with **Sports Hero.**

Crammed into the Spectrum's memory are four events — 100 metre sprint, long jump, 110 metre hurdles and the pole vault with a choice of three levels.

Under starters orders — BANG — and the runners were off, haring through the streets past grafitti covered billboards proclaiming 'Brixton Rules'. No time to recover — on to the next event.

If you qualify in all four events you will go onto the next level where you will find yourself running for the university team.

The game is played in the same way as Track & Field where you have two run buttons and a jump button — necessary for hurdles, pole vault and the long jump. In order to run you will have to press the run buttons rapidly and an indicator will chart your speed.

A few small grouses — there isn't any sound except for a bleep from the starter's pistol. The game would be greatly enhanced if you could hear the sound of feet pounding up the track.

Sports Hero is a one player game so you do lose the competitive aspect when playing with someone else and there are only four events albeit over three difficulty levels. Programmers are stretching the Spectrum to its limits — more events would have added a welcome variation.

Clare Edgeley

SPORTS HERO
Memory: **48K**
Price: **£6.75**
Joystick: **Sinclair, Programmable**
Gilbert Factor: **6**

more software on page 42

FIRST

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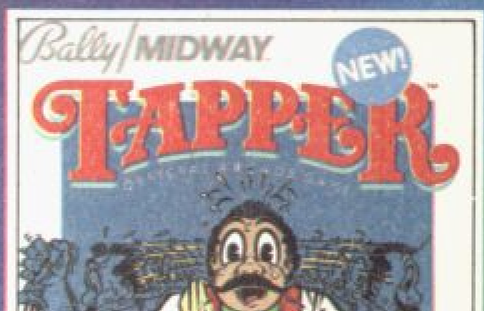
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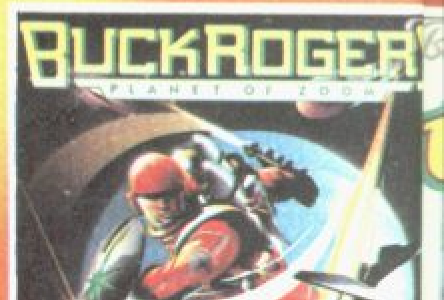
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Action through the ages

EUREKA!, Ian Livingstone's package, from Domark, contains something for everyone. Each of the five sections is prefaced with an arcade game which builds up the character's strength, or vigor, but tires the playing fingers.

In the prehistoric maze you are represented by a little figure, the size of a character square and difficult to distinguish from its background. You must guide it around the maze, picking up roast chicken legs while avoiding flashing squares which rush at you and jumping on those which try to run away.

All those antics have a strange sort of logic to them. If you want to keep your sanity, however, it is best to pick up the nearest leg and make a dash for the exit. If you are not quick enough on the fire button, for this game surely requires a joystick, more chicken legs are scattered around the maze.

Once through the finger punishment phase one of the adventures may be loaded. Those take you into a series of time slips through which you have to travel to find the pieces of a talisman first discovered on the moon by Apollo XVII but later shattered and lost in time.

First stop is the prehistoric age in which you can become breakfast for a dinosaur, discover hidden pitfalls, and become lost in one of the many forests which dominate the land.

If, after that, you are inclined to travel further you can load the next program and slip back to Ancient Rome where the slaves are revolting and the lions ravenous. Livingstone's long association with role-playing games ensures that full mythology value is injected into the scenario.

The mythological strain continues with a trip to Celtic Britain where you have to rescue the wizard Merlin and meet the crew of Camelot.

Once you have got those pieces of the talisman you can travel to the two final segments of the package which take place in the near past.

Despite the combination of arcade and adventure games the package is disappointing as it offers nothing new.

The package is good value however, especially considering the £25,000 prize for the lucky winner.

John Gilbert

EUREKA!
Memory: **48K**
Price: **£14.95**
Joystick: **Kempston, Sinclair**
Gilbert Factor: **8**

Heroics for he-men

THE USUAL lantern-jawed, muscle-bound hero adorns the cover of **Tower of Despair** from Games Workshop. A swift reading of the background history reveals a plot and setting not too far removed from *Lord of the Rings* — the hellish and very nasty sorcerer has resurfaced and orcs are abroad.

The Wizards' Council is extremely worried and has summoned you, the warrior-mage of Castle Argent and part-time weight lifter, to remove this Malnor chap and his demonic legions.

To do that you must find the Golden Gauntlet, currently in the possession of another elderly ex-hero. Journey through the wilderness, survive many perils, find the Tower, rub out Malnor. So much for the plot.

The adventure contains two complete sections. The program is written on the Quill and is text-only, though the character set has been changed to a pleasant medieval script with the occasional illuminated capital.

Naturally enough there are assorted monsters to overcome and care will need to be taken with the magical artifacts you encounter.

D & D devotees will probably feel at home in the land of Aelandor but more reluctant heroes may find they have been there too many times already.

Richard Price

TOWER OF DESPAIR
Memory: **48K**
Price: **£7.95**
Gilbert Factor: **5**

Conquer Kent, crush Kabul

ALTHOUGH there have been many attempts to produce wargames on the Spectrum of comparable quality to the boardgames of the mid-seventies, few have managed to match their ancestors.

Lothlorien has attempted to rectify that with **Confrontation,** a system which allows players to define their own maps and forces for play.

The system suffers from being a two-player game, relegating the computer to the role of the umpire.

Battles are modern in style, with armoured and foot infantry, aircraft and artillery. The mechanics are of the move-fire type, with mobile units moving first and each player moving in turn.

The graphics are attractive and easy to follow. There are no confusing figures to interpret.

The Confrontation package includes a simple scenario to start you off. Lothlorien has also released a cassette of scenarios based on 'real' events, which cannot be used without the original program.

The scenarios are bold in conception; Egypt vs Israel across the Sinai desert is an exercise in chess-like precision of communication lines.

An Angolan scenario in which Unita defends coastal strongpoints against Cuban-trained forces introduces the possibility of South African reinforcements.

Operation Sea Lion enters the world of alternative history with the German invasion of Kent, while the fourth scenario has a Soviet column attempting to force a passage through the mountain passes of Afghanistan.

All of the scenarios, as well as the main program, are well-constructed and represent challenging problems for keen wargamers. They will welcome the series with enthusiasm. But those who cannot claim to be avid armchair generals are less likely to find a sometimes frustrating business enthralling enough to justify the investment.

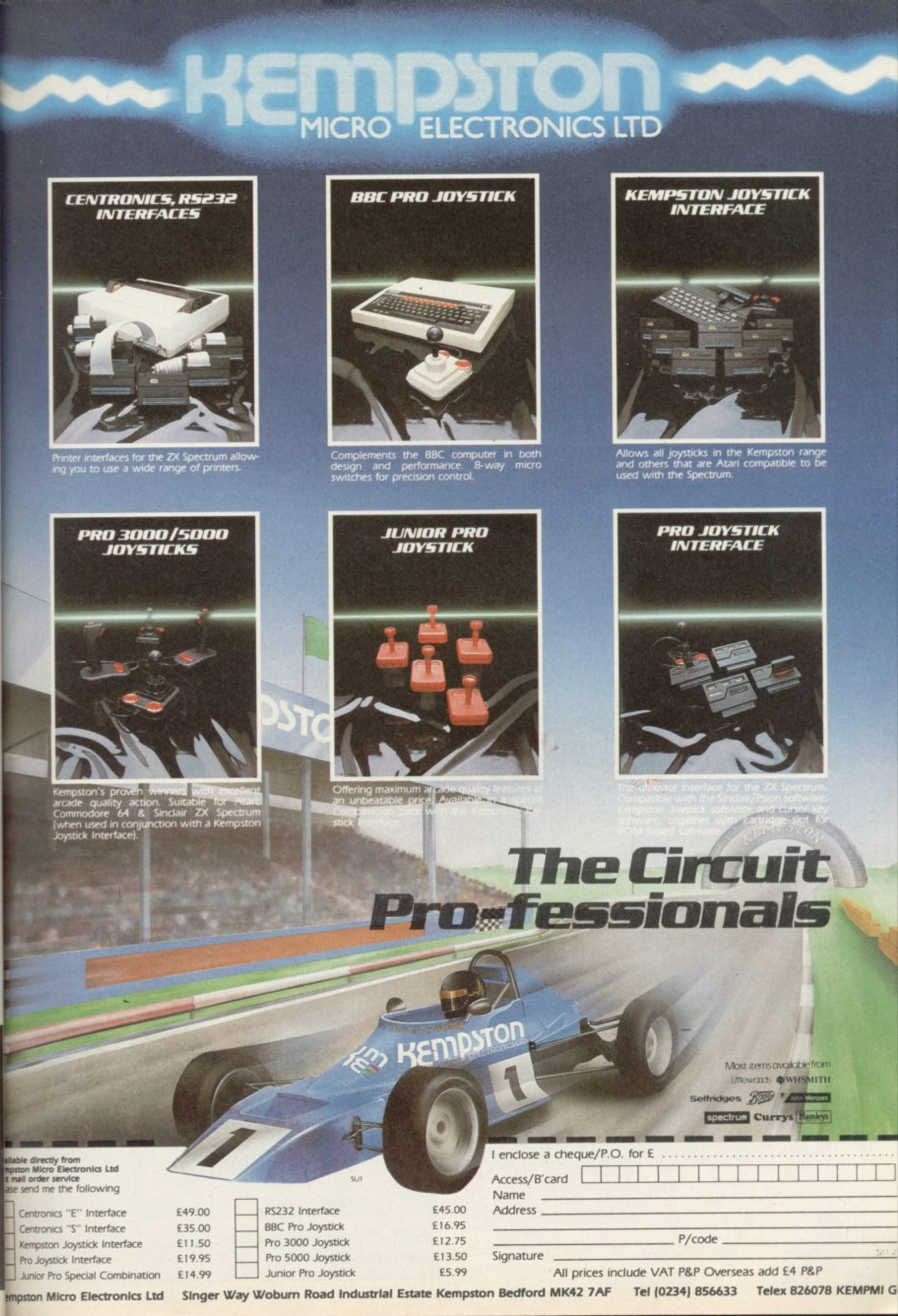
Chris Bourne

CONFRONTATION MASTER PROGRAM
Memory: **48K**
Price: **£7.95**
Gilbert Factor: **7**

CONFRONTATION SCENARIOS VOLUME 1
Memory: **48K**
Price: **£5.95**
Gilbert Factor: **7**

more software on page 44




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An audience with Machiavelli's Prince

DUPLICITY, cunning and self-interest are the keynotes of the 1984 Cambridge Award winner, **The Prince,** written by John Sherry and published by CCS. The title is consciously derived from Machiavelli's handbook of politics and is designed for four players.

Set in a gloomy renaissance fortress the game is a combination of strategy and adventure formats. The aim is to become Loremaster and chief counsellor to the Prince, ruler of this land, and each character must get to the top by any means possible — whether it be theft, kidnap or mayhem.

After engaging the services of henchmen — who can 'hit' other castle servants and characters — and spies who can report on the actions of other people, each player moves around the fortress giving instructions to his staff and trying to secure the tokens which will ensure advancement. Goods can be bought and sold from the castle trader and a banker will arrange transfers of cash. Each player has a passcode which will allow him to take his turn — other players are not supposed to observe this but are sure to try.

Life is not simple since any of the spies and henches recruited may well be working for other player-characters and information may be bought and sold.

The computer keeps track of your money and possessions and informs you of your current position at the beginning of each turn. Input is in standard verb/noun combinations and there is a hidden vocabulary besides the predefined commands for controlling your gang.

The Prince will involve you in much bargaining and chicanery with the three other human players. Alliances may be formed and broken, lying and deceit will be the most normal interactions. An audience with the Prince himself is possible but he is temperamental and will brook no impertinence.

Ten inputs are allowed for each turn so you must plan your strategy carefully. Pictures of the people you are talking to are shown on-screen and the character set is a mock-gothic script.

The game is well-constructed and, since you only ever have a partial view of the goings on, is full of the unexpected. *Diplomacy* addicts will feel quite at home here as the web of treachery spreads through the palace and it is easy to become utterly absorbed in your character.

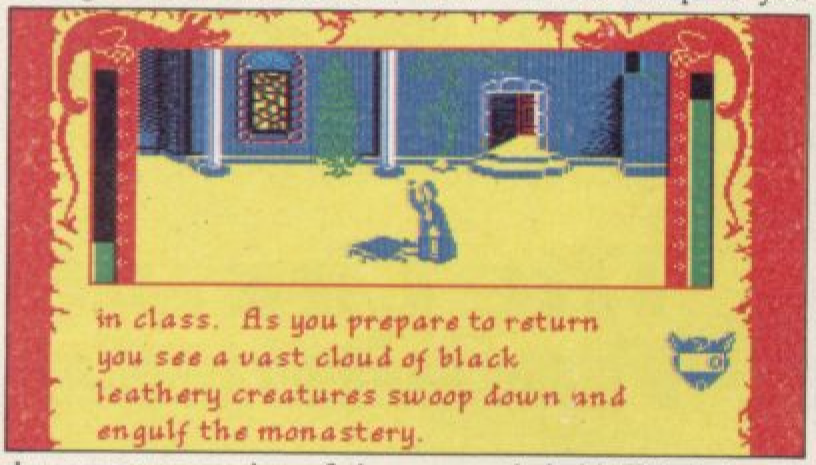
Richard Price

THE PRINCE
Memory: **48K**
Price: **£7.95**
Gilbert Factor: **8**

Code of the warrior

BEFORE your very eyes the bestial forces of the Darklords have destroyed your monastery and friends. Revenge is in your heart but you must first reach the capital and warn the king of the impending onslaught. War and danger will bedevil your every step.

Flight from the Dark is the computer version of the Arrow single role-play book and the program is packaged with it for double enjoyment and references. The program contains new situations but follows the original plot and the screen display will show if you are dealing with a section of the book by indicating the relevant paragraph.



Options are scrolled up below the graphic display and the choice is made by a keypress. Other actions are also controlled by single keys and an overlay is provided for the purpose — this could have been made more solidly.

The graphics are animated and you are shown walking or riding through the locations. If you encounter an enemy there is a very clever combat sequence which allows you to thrust, swipe, chop and parry with whatever weapons you currently hold. This is in real time and can be a nail biting experience as your survival will depend on the fighting skill you have built up in the course of your travels.

Addicts of the book version will find the program every bit as demanding and exciting. The general quality of the graphics enhances that pleasure.

Richard Price

FLIGHT FROM THE DARK
Memory: **48K**
Price: **£8.95**
Gilbert Factor: **8**

Willy in armour

IF YOU OWN a 16K Spectrum and have felt left out since Manic Miner and Jet Set Willy were produced for the 48K machine then **Sir Lancelot,** from Melbourne House, may take away some of the heartache.

Although the author does not equate the game with the best-selling Willy series there are some obvious parallels. As the fabled knight in shining armour you must investigate 24 rooms through which have been strewn treasures, including keys, crowns and gold, and seven different types of monster. They move mechanically up and down or across the screen and your task is to develop a strategy to defeat them and retrieve the treasure.

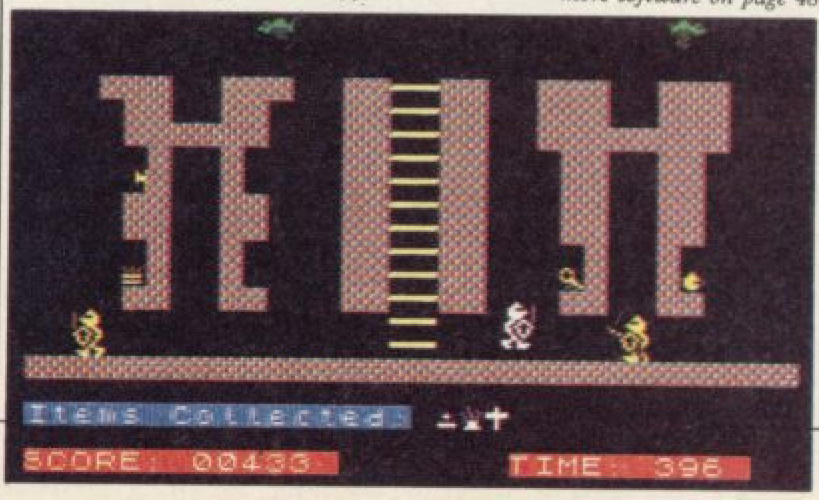
The solutions to the treasure quests on each screen are made harder when the objects seem to be out of reach. However, each screen contains an answer and it just takes practice to get to the next one.

Sir Lancelot is a 48K game crammed into a 16K machine and as such the author should be congratulated.

John Gilbert

SIR LANCELOT
Memory: **16/48K**
Price: **£5.95**
Joystick: **Kempston, Sinclair, Cursor**
Gilbert Factor: **7**

more software on page 48



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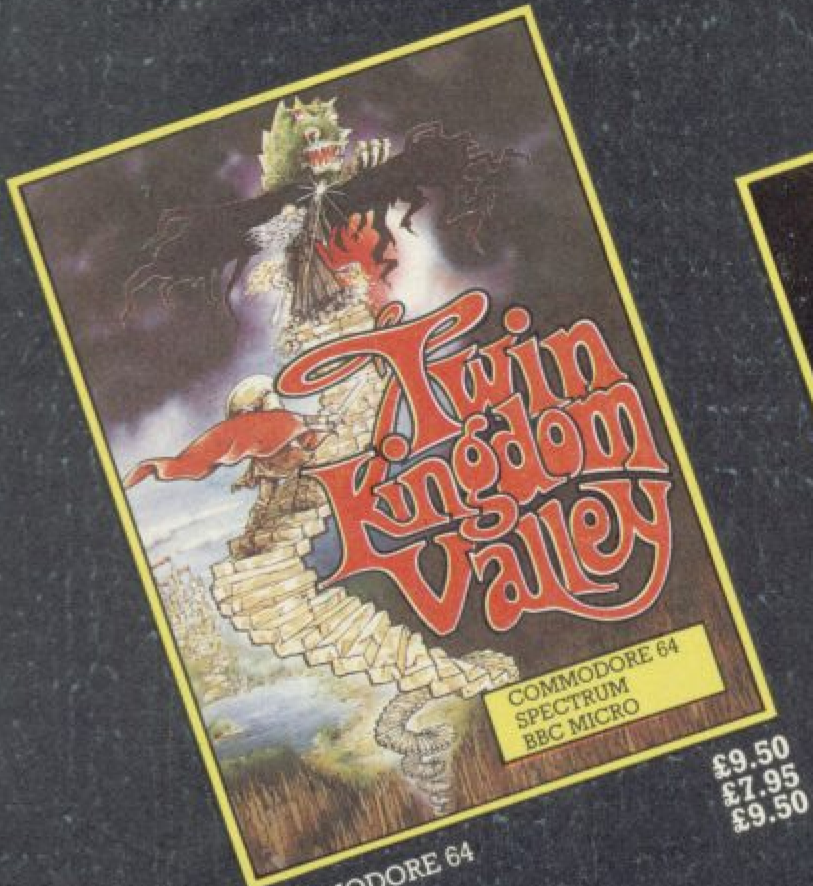
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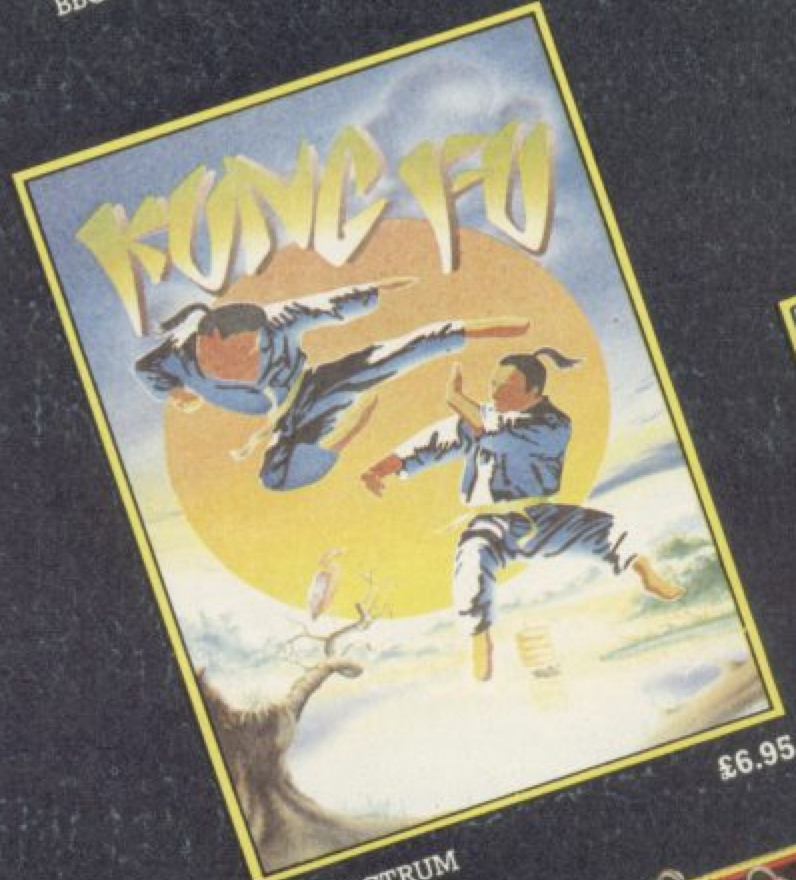
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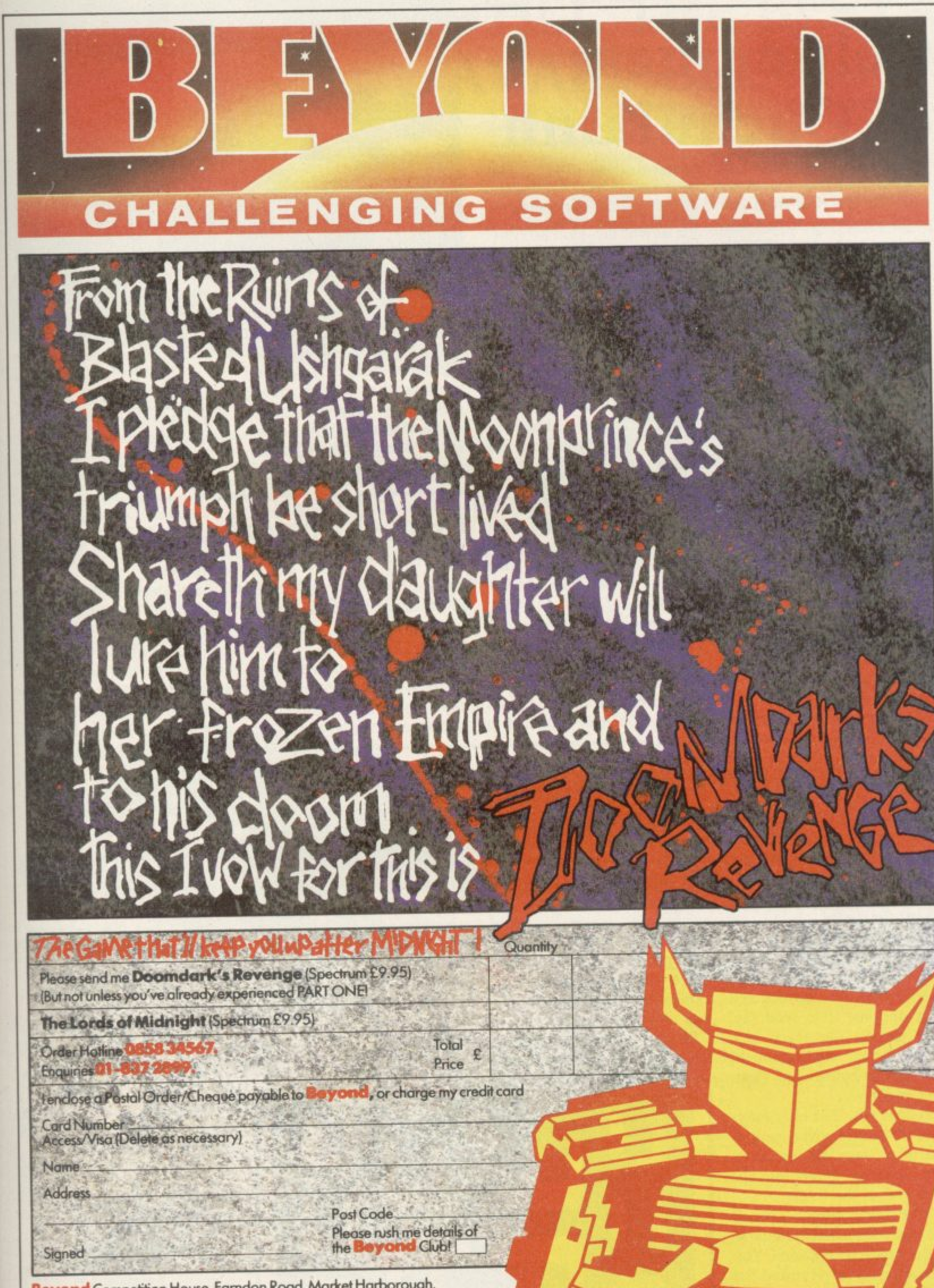
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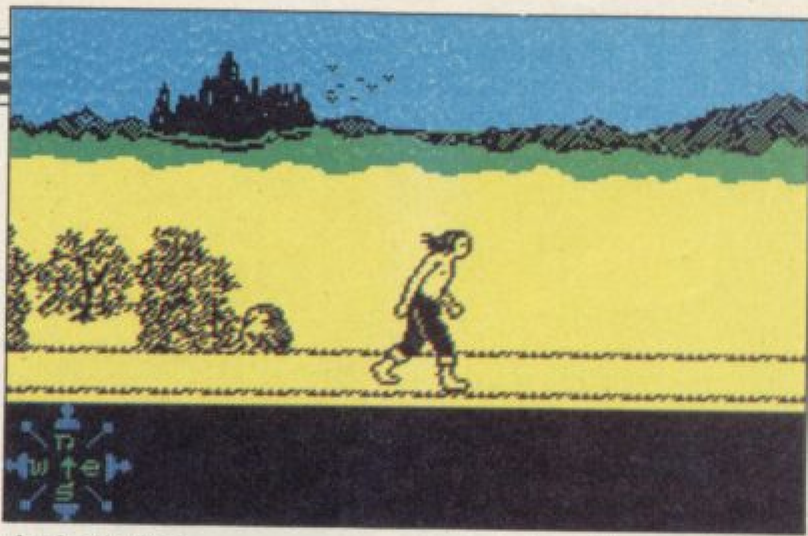
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Celtic quest of Cuchulainn



OTHER programmers will find it difficult competing with **Tir Na Nog** from Gargoyle. Until you have loaded up you may think that the booklet's boast of a 'computer movie' is pushing it a bit. Not so — this animated graphics adventure is bound to become a classic of Spectrum programming and portrays the travels and adventures of the hero Cuchulainn through the Celtic afterworld, Tir Na Nog.

Cuchulainn strides tall, clear and purposeful along the paths of his world. Fore-, middle- and backgrounds scroll independently behind him, giving a convincing likeness of real movement. The camera angle can be altered so that he can be seen from four viewpoints and the scenery changes accordingly. The clouds roll, smoke billows, birds flutter.

Other characters are shown in equal detail and live their own lives whilst Cuchulainn obeys you in his search for the fragments of the Seal of Calum.

Not that you have to pursue the quest. You may choose to wander the roads and explore the intricacies of the world or follow secondary objectives that may well need to be completed before the major aim can be accomplished. Other characters may lay tasks on you too and events may force you in a certain direction at times.

Beware of the Sidhe, those powerful, dangerous and magical beings who also use the pathways. Combat may occur if all else fails and Cuchulainn can thrust with any weapon he may have found. To progress and survive you will need persistence, lateral thinking and good luck — though of course you cannot be killed, merely returned to the beginning.

The game is not designed as a text adventure and uses the keyboard for movement and initiating various actions. Do not be misled by this into thinking that it is an arcade game — the program scope is vast and the world it depicts is alive and full of atmosphere. This is a full adventure and, with no single or simple solution, may keep you occupied for a long, long time. Highly original and stunningly presented.

Richard Price

TIR NA NOG
Memory: **48K**
Price: **£9.95**
Gilbert Factor: **9**

Grasshopper's leap

BECOME a master of the ancient oriental art of Kung-Fu without dislocating your back or having the wind knocked out of you.

Kung-Fu, from Bug-Byte, is described as a totally animated combat game for two players or one player and the computer.

Each player controls one of the Kung-Fu fighters which must approach each other in a very inscrutable way before bashing the hell out of each other. Bug-Byte may enthuse about the graphics and crow about the cleverly designed fighters but, although the display initially looks impressive, movement is jerky and action slow. The fighters move as if they are robots.

Much emphasis is put on the techniques which the fighters can use when in action. Such moves are fairly authentic but the movement between a standing pose and making contact with the other player could have been made more realistic.

If you are going to play Kung-Fu with any kind of agility then you will need a joystick. You will then at least get some enjoyment out of it and not get whitewashed by a computer Ninja.

John Gilbert

KUNG-FU
Memory: **48K**
Price: **£6.95**
Joystick: **Programmable, Cursor, Sinclair, Kempston**
Gilbert Factor: **6**

Game for the turtally warped

CLAIRVOYANTS should have a ball with **Turtle Timewarp** from Softstone. A brief examination of the cassette blurb reveals nothing about the game apart from the loading instructions.

After a nice loading screen information appears offering redefinable keys, joystick and start options. Fine, you say, and punch the start key, thinking that enlightenment will arrive before the game gets under way.

It does not. The only reference to the aim of the game is the brief 'save all turtles in this amazing game' on the back end of the insert.

The screen depicts a small 2D maze with questionmarks in the dead-end portions. You manoeuvre a turtle round the maze into the questionmarks. Sometimes that results in the creation of unpleasant insects to add to those already chasing the turtle.

Sometimes a house is materialised which blocks off corners and makes life more difficult for the biting bees. If they get you, you lose a life. Once you have managed to explore all the questionmarks you move up a screen.

With no game concept to latch onto the business seems singularly pointless, though the graphics are reasonably fast. The competent rendering of *Für Elise* was more gripping than the game and the choice of questionmarks as symbol very apt. A crystal ball could come in handy if you have one.

Richard Price

TURTLE TIMEWARP
Memory: **48K**
Price: **£2.99**
Joystick: **Kempston**
Gilbert Factor: **4**



more software on page 50

Fuller MICRO SYSTEMS

STILL THE BEST AVAILABLE

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Gold plate contact keys are used, guaranteed life of 10⁶ operations



Tough ABS case, 225mm x 350mm x 65mm deep

It's easy to see why the FDS Keyboard is the best selling Spectrum keyboard in the world. This stylish, slim-line keyboard has been transforming Spectrums world-wide.
The keyboard contains all the graphic characters of your ZX Spectrum, plus additional function keys. It has 4 cursor control keys, an auto rub-out key, a separate key for full stop and comma, a full length space bar, shift keys either side and 2 function keys for direct entry into green and red E modes.
The FDS Keyboard has real individual contact switches and not a membrane like most other Spectrum keyboards on the market which are more expensive.
The case is easily adapted to allow the microdrive to fit inside along with the power supply.
Fixing is simplicity itself and no soldering or technical knowledge is required.

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The FD42 keyboard is still a firm favourite when it comes to a low cost option for your ZX81 or Spectrum. It is now a "standard" to Sinclair users. Neatly presented in an attractive ABS plastic case it transforms the Sinclair computer into a useful professional unit, providing all the graphic characters of the ZX81 or Spectrum, with additional keys to aid the user. No technical knowledge is required for installation. **£29.95** + 80p p&p



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The Fuller Box can be bought separately for £29.95 and the Orator for £34.95 + 80p p&p

This is the ultimate games unit, containing not only the sound synthesiser from the Fuller Box but also the speech unit from the Fuller Orator.
It will probably be the only add-on you will need to buy after the Spectrum. We don't call this the Master Unit for nothing as it contains a Programmable Sound Generator, Joystick Controller, Beep Amplifier, Cassette Interface, Through Bus and 'Orator' Phoneme Voice Synthesiser plus a three-inch loud speaker and volume control. Speech can be synthesised easily so that your micro can talk to you and play chords of music at the same time. Directly accessible in Basic it is able to say anything you command using the keyboard or a games program.

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Snowbound in Eden



DOWN to earth at last, Kim Kimberley, secret agent extraordinaire and saviour of the starship *Snowball*, has been framed for an act of sabotage. Fleeing the wrath of the woken colonists she steals a stratoglider and enters the atmosphere of Eden, the *Snowball's* destination. Condemned to death she has only a short time to hide in the luxuriant and bizarre undergrowth of the planet. The ship need only turn its engines towards her to fry her to a crisp.

So begins **Return to Eden,** another brain scrambling adventure from Level 9 and sequel to **Snowball.** The presentation has changed — the game includes location graphics, yellow word display on a black background and 'write ahead'. That feature allows you to input text in a continuous flow without waiting for the cursor to reappear.

There are around 250 locations and Level 9 claims that the use of graphics has not adversely affected the amount of description or the general quality. Initial exploration seems to back that up. If you find the graphics too slow they can be switched out.

Once safe in the jungle you must head out for the robot-manned city in the east. You must survive amongst the beautiful but lethal flora and fauna and avoid the robot devices which protect the city.

Problems and puzzles abound; this is a world unknown to humans and many plants or creatures have odd properties. Just trying to survive ten minutes is difficult — Level 9 keep rolling those heavy dice on you but give you a few resurrections before finishing you off.

Exhausted compulsives of the firm's other works may just as well admit to themselves now that they probably won't be sleeping much for the next few months. Atmospheric and original.

Richard Price

RETURN TO EDEN
Memory: **48K**
Price: **£9.95**
Gilbert Factor: **8**

Space, the final . . ?

THE AGE OLD game of **Star Trek** has been resurrected to bring to your screens **New Cylon Attack,** from A'N'F Software.

Following the successful BBC version of the game, New Cylon Attack now boasts improved graphics and playability.

The storyline is familiar and brings to mind scenes of a portly Captain Kirk at the helm of the *Starship Enterprise.* You are pilot on board a supply ship carrying reinforcements to a distant planet in a war-torn galaxy.

The game portrays the sights of your laser gun in the middle of the screen with moving crosshairs. By moving these you are able to pinpoint the Cylons as they fly at the mothership.

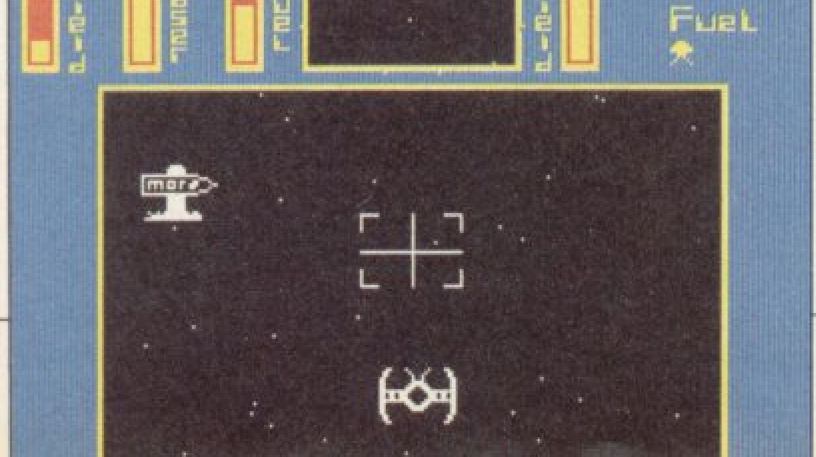
As well as the radar scanner there are a few other instruments which need constant monitoring including fuel situation, the state of your lasers and shield strength.

Your tanks may be refuelled during the game, which involves wandering round space looking for the mothership to dock on to. No fun with empty tanks and as often as not your fuel will run out just as she is in sight.

The graphics aren't astounding and the sound fairly average. New Cylon Attack is not the most original game but it is by no means the worst.

Clare Edgeley

NEW CYLON ATTACK
Memory: **48K**
Price: **£5.75**
Joystick: **Kempston**
Gilbert Factor: **5**



A better Basic

BETA BASIC, from Betasoft, has already established itself as the standard extended Basic for the Spectrum. The launch of version 1.8 confirms that view with routines added to support Interface and microdrives.

The new language adds 30 new commands and 20 functions to Sinclair Basic and makes use of the structuring commands which are available for machines such as the BBC Micro and the Commodore SX-64

The language is so much better than the Sinclair Basic. As well as the structure commands such as DEF PROC which creates procedures similar to those on the QL there are also programming aid utilities, graphics commands, easier access to the memory of the Spectrum and a real time clock which even has an alarm.

The utilities include an AUTOline number command, a command which TRACEs the number of a line as it is executed in a program RUN and a horizontal screen SCROLL which behaves in a similar fashion to that on the ZX-81. There is also a ROLL utility which will scroll the screen vertically in any direction.

The 20 new functions include a PEEK which looks at 16-bit words, decimal to binary and decimal to hexadecimal converters, a SCREEN$ command which recognises both ordinary and user defined graphics and a function to convert a number into a different format such as that of decimal currency.

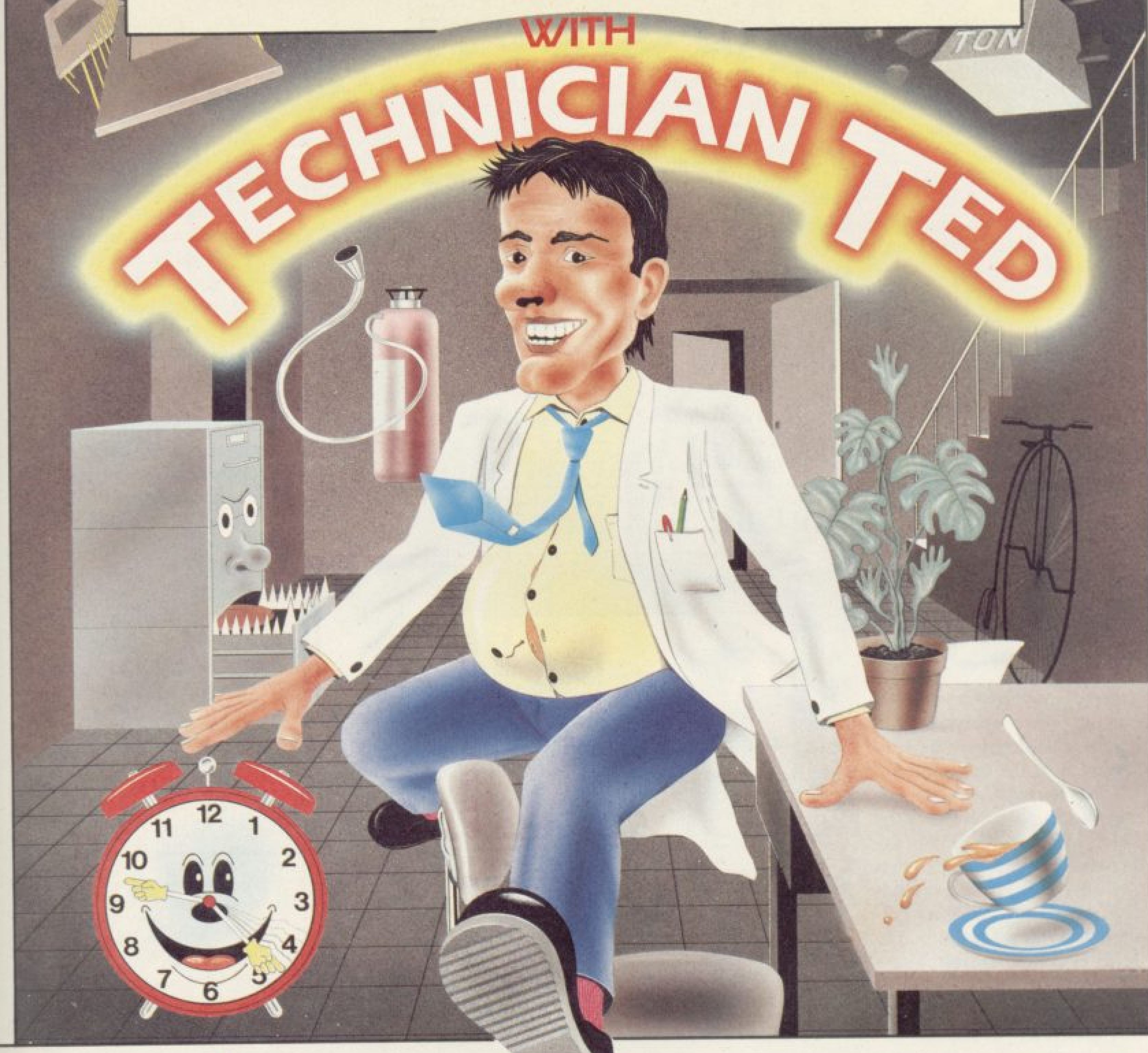
It is a great pity that Sinclair Research has not brought out a version of Beta Basic on its new Spectrum+ either on board the machine or as a microdrive cartridge or ROM. Betasoft turns Sinclair Basic from a good version of the language to a fantastic one.

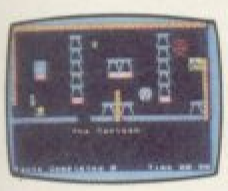
John Gilbert

BETA BASIC
Memory: **48K**
Price: **£11.00**
Gilbert Factor: **9**

more software on page 52

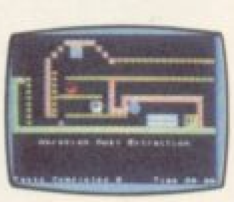
ARCADE ADVENTURE WITH TECHNICIAN TED





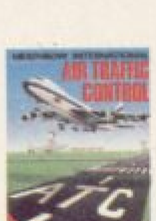


As Technician Ted you clock in for work at the strangest factory – even getting in can be a problem! You have a number of important tasks to perform, but most days there just don't seem to be enough hours in the day to get all your work completed.
See if you can get through 50 screens of varying complexity, but watch out for the most unhelpful workmates you ever came across! There's the Fire Extinguisher that seems to have gone beserk! Some very unfriendly faces, and even the boardroom chairs aren't always what they seem!
What's more, Technician Ted incorporates a unique animated loading screen and perfected collision detection.
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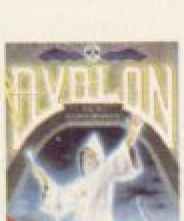
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Knocked for six

A "REVOLUTIONARY" concept, at least according to publisher Computer Records, has recently hit the streets in the form of a compilation of 12 popular games from companies including Bug-Byte, Quicksilva, Anirog and Ocean.

They have been released under the collective title **Select 1** and the company claims that if every game was brought separately the player would have to pay about £70.00. Quite a saving.

Some of the games are ancient but in the same package you will find more recent titles which include **Hunchback, Mr Wimpy, Missile Defence, Pool, Denis through the Drinking Glass** and **Moon Buggy.**

In Denis through the Drinking Glass, the idea is to help Denis Thatcher stagger to the Gravediggers Arms to revitalise the parts that Maggie cannot reach.

In this Quilled adventure from Application Software, Denis is at his wits end — there is not a drop of booze at No 10. Escaping from Maggie's loving clutches is no easy matter and apart from the worry of being caught by the wife he has to negotiate sundry personalities as Mary Whitehouse and Ken Livingstone en route.

The player has only ten moves in which to find the elusive flask of gin which makes up Denis' breakfast. Without it he will fall into a stupor and the game will end. Delirium tremens sets in if at the ninth move Denis still hasn't had a swig.

Denis through the Drinking Glass gently mocks the Iron Lady and her retinue in a game which can be great fun.

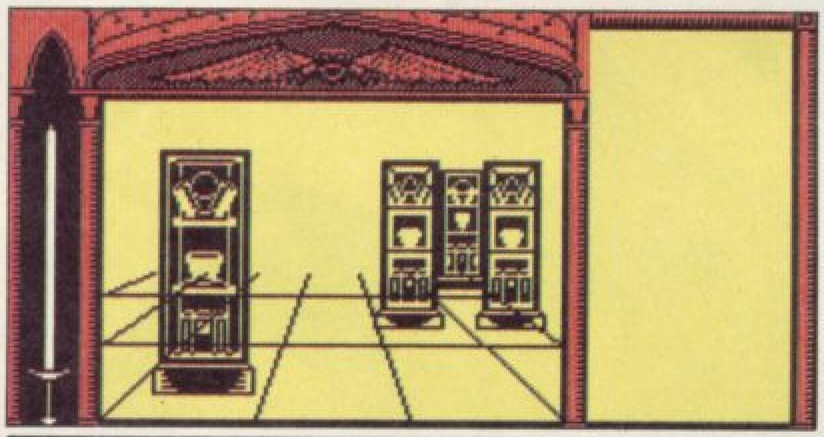
Missile Defence from Anirog is based on the classic arcade game where you have to protect your city from a murderous alien attack. The game is quite fast, but your bomb sights move too slowly to contain the aliens on the higher levels.

Moon Buggy, also from Anirog, is a poor representation of the original game. The graphics are sketchy with an almost unchanging background, and the aliens are almost non-existent.

However, the package is very good value especially as a Christmas present. You may well have most of the games but even the three or four games which are new to you will make the package worthwhile. *Clare Edgeley*

SELECT 1
Memory: **48K**
Price: **£12.49**
Joystick: **Available for some of the games**
Gilbert Factor: **7**

Arthur's unoriginal adventure



REMEMBER the old dinosaur mazes? Moving along one square at a time you could turn right or left to enter side passages. **King Arthur's Quest** uses a similar type of movement system, though the countryside and rooms depicted are not bounded in the same way.

The wicked Morgana Le Fay has put a spell upon the land. The world is slowly dying and you must save it from the Enchantress and her magic. You begin in Merlin's cottage and must examine the grids to collect useful objects or meet the various characters.

There are nine basic actions each carried out by a single key press — a rather flimsy overlay is provided to show the relevant keys.

This is not a normal text adventure, given the very limited range of input, and may consequently appeal to a younger age group. The graphic displays are sufficiently pleasant, though unoriginal in style, and the response time is fast. There is a microdrive transfer facility but if you are killed during play you must reload.

Richard Price

KING ARTHUR'S QUEST
Memory: **48K**
Price: **£7.95**
Gilbert Factor: **4**

How to make a touchdown

FOURTH down and three. Will you run or pass?

If that means little to you then you are clearly no fan of American Football. Recent television coverage of the sport has aroused an interest in Britain, and Argus Software has responded by releasing a simulation, **American Football.**

The game is a strategy version, in which you as the team coach select your style of attack or defence from a menu, and the computer, or another player, selects a response. The results are displayed on the screen with animated graphics rather in the style of **Football Manager,** with small figures moving into various positions and working through the selected plays.

American Football lends itself well to computer simulation, as the real game is played as a series of tactical set pieces where the object is to gain as many yards from a single play as possible, before scoring a touchdown by taking the ball across the opponents' goal line. Since the game proceeds in fits and starts, the computer version does not lose so much realism as comparable versions of Soccer or Basketball.

Those who are not familiar with the sport are nevertheless unlikely to be enthusiastic about the game, as it only really becomes fun if you allow your imagination to visualise what is being simulated.

For those who do know something of the game, the program is much more fun, and can be heartily recommended. *Chris Bourne*

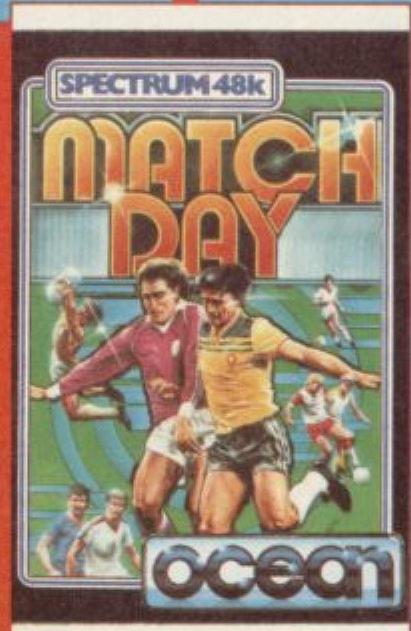
AMERICAN FOOTBALL
Memory: **48K**
Price: **£9.99**
Gilbert Factor: **7**




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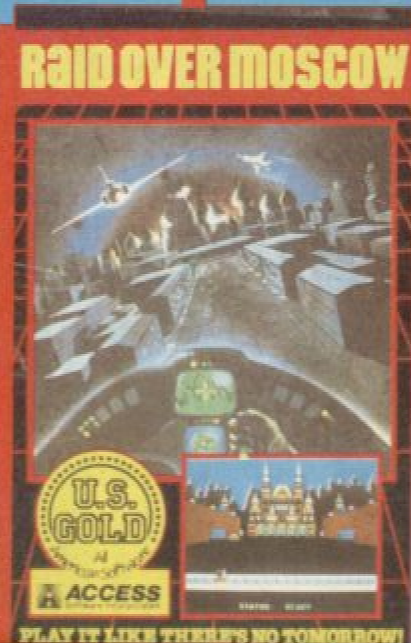
DAILY Mirror sinclair user

SOFTWARE TOP 30



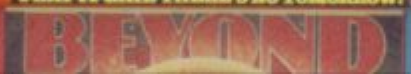






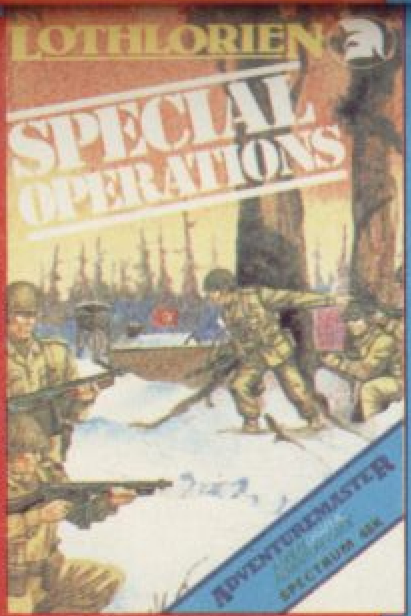
THIS WEEK	LAST WEEK	WEEKS IN CHART	TITLE Publisher	Computer	SPECTRUM	VIC 20	CMMDRE 64	ELECTRON	ATARI	DRAGON	ORIC	BBC	OTHER
					(Also Available on)								
1	1	6	DALEY THOMPSON'S DECATHLON OCEAN	SPECTRUM	●		●						
2	2	7	DALEY THOMPSON'S DECATHLON OCEAN	COMMODORE 64	●		●						
3	3	4	ELITE ACORNSOFT	BBC								●	
4	6	2	COMBAT LYNX DURRELL	SPECTRUM	●								
5	10	4	CHILLER MASTERTRONIC	COMMODORE 64			●						
6	–	1	UNDERWURLDE ULTIMATE	SPECTRUM	●								
7	–	1	SELECT GAMES ONE COMPUTER RECORDS	COMMODORE 64	●		●						
11	21	2	BMX RACER MASTERTRONIC	SPECTRUM	●								
12	22	2	TIR-NA-NOG GARGOYLE	SPECTRUM	●								

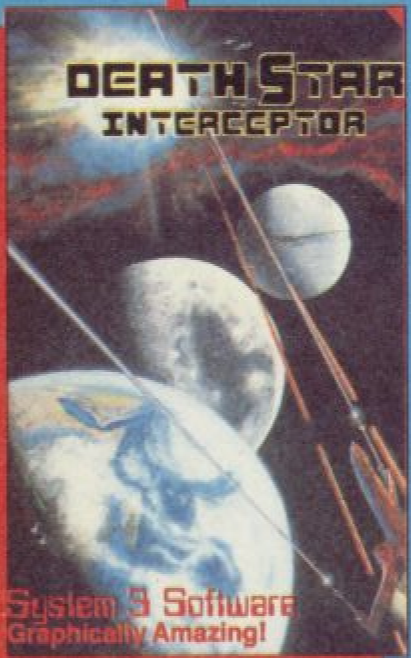


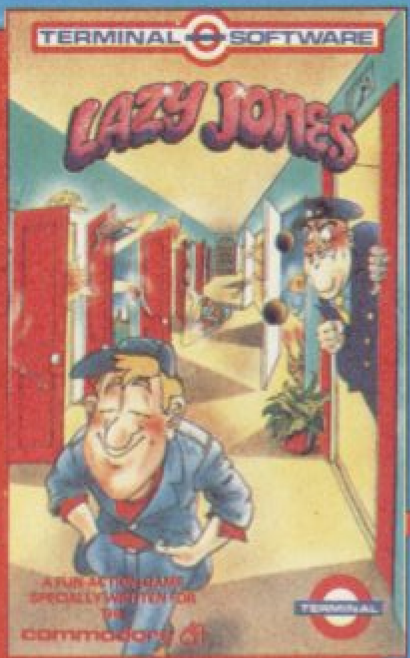




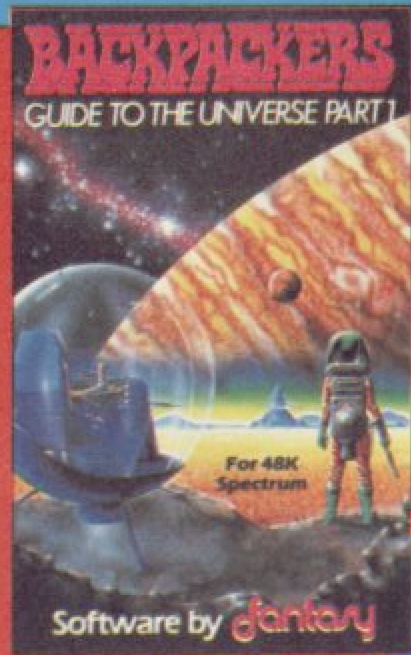
6	–	1	UNDERWURLDE ULTIMATE	SPECTRUM	●								
7	–	1	SELECT GAMES ONE COMPUTER RECORDS	COMMODORE 64	●		●						
8	11	1	PYJAMARAMA MIKRO-GEN	SPECTRUM	●								
11	21	2	BMX RACER MASTERTRONIC	SPECTRUM	●								
12	22	2	TIR-NA-NOG GARGOYLE	SPECTRUM	●								
13	18	4	KOKONTONI WILF ELITE	SPECTRUM	●								
14	7	3	JET SET WILLY SOFTWARE PROJECTS	COMMODORE 64	●		●						
15	15	6	MONTY MOLE GREMLIN GRAPHICS	COMMODORE 64	●		●						
16	–	1	PERILS OF WILLY SOFTWARE PROJECTS	VIC 20		●							
17	–	1	EDDIE KIDD'S JUMP CHALLENGE MARTECH	SPECTRUM	●								
18	–	1	BACKPACKER'S GUIDE TO THE UNIVERSE FANTASY	SPECTRUM	●								
19	–	1	KNIGHT LORE ULTIMATE	SPECTRUM	●								
20	16	2	DECATHLON ACTIVISION	COMMODORE 64	●		●						
21	19	3	D.M. IN DOUBLE TROUBLE CREATIVE SPARKS	SPECTRUM	●		●						
22	4	4	BEACH-HEAD ACCESS/U.S. GOLD	SPECTRUM	●		●						
23	–	1	SUICIDE EXPRESS GREMLIN GRAPHICS	COMMODORE 64			●						
24=	–	1	AMERICAN FOOTBALL MIND GAMES	SPECTRUM	●								
24=	8	2	AVALON HEWSON CONSULTANTS	SPECTRUM	●								
26	27	2	SUMMER GAMES QUICKSILVA	COMMODORE 64			●						
27	–	1	RUBIK CUBE SOLO	SHARP									●
28	–	1	D.M. IN THE BLACK FOREST CHATEAU CREATIVE SPARKS	SPECTRUM	●		●						
29	23	10	FULL THROTTLE MICROMEGA	SPECTRUM	●								
30=	–	1	STEVE DAVIS' SNOOKER CDS MICRO	SPECTRUM	●								
30=	–	1	MANIC MINER BUG BYTE/SOFTWARE PROJECTS	SPECTRUM	●		●			●	●	●	●

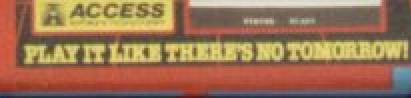


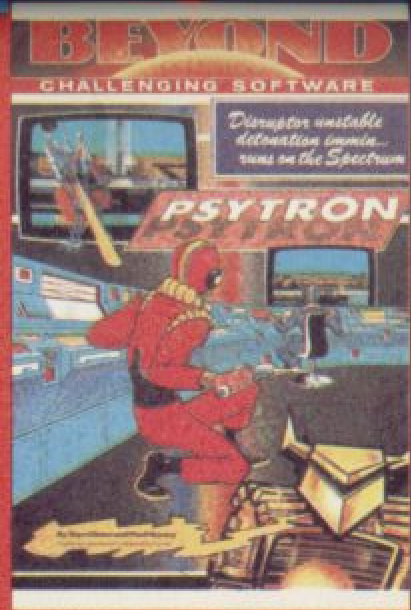


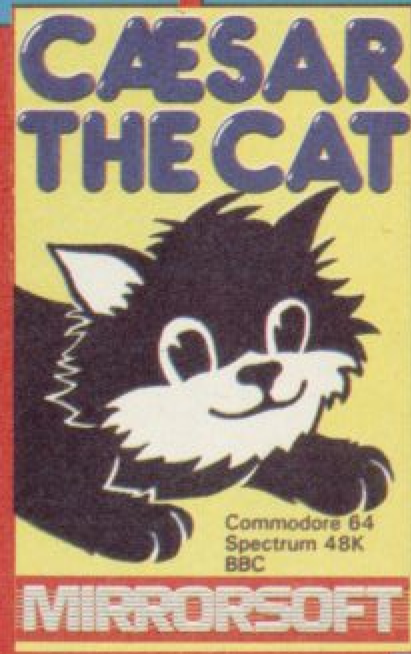


Look out for the brand new Top Ten in the Saturday edition of the Daily Mirror every fortnight and Sinclair User every month. The information for the Top 30 is compiled by N.O.P. Market Research and founded by Computer & Video Games magazine in sponsorship with the Daily Mirror.










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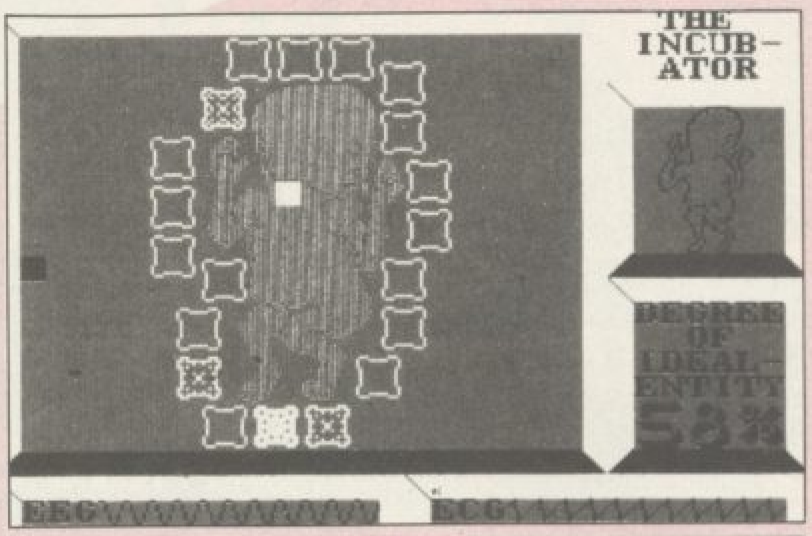

WELCOME TO THE MACHINE
Enter a sinister world of genetic manipulation and ideological brainwashing in Deus Ex Machina, Automata's unnerving vision of a future controlled by computers and monitored by the ever-present defect police.
Deus Ex Machina is a total experience. The game takes you through seven stages of life, as you struggle to maintain your humanity against the forces of control. Superb graphics and animation, of psychedelic intensity, are linked to a fully synchronised soundtrack featuring the talents of star actors and musicians.
There has never been a game like it; Deus Ex Machina will blow your mind.

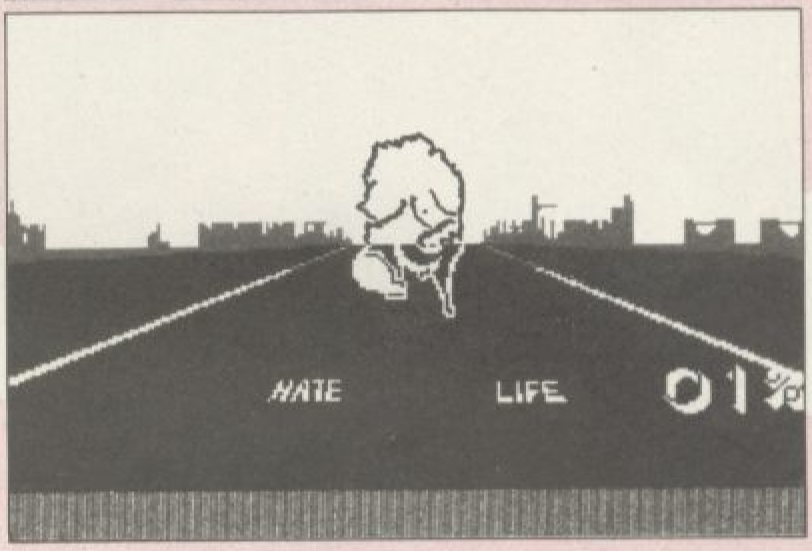
COMPETITION

AUTOMATA, creator of the lunatic Pi-Man, is giving away 50 copies of *Deus Ex Machina* to *Sinclair User* readers. All you have to do is identify the fourteen titles of Automata games plus the name of a truly excellent magazine in our special wordsquare below. The answers may be spelt backwards or forwards, up, down or diagonally. Just to make life easier for you, we have given you one of the answers already. You will have to find the rest.

When you have done that, name the two personalities in the pictures, both of whom are involved in the soundtrack of the game.

Send the completed wordsquare, or a copy, plus the names of the two celebrities to *Sinclair User*, EMAP Business and Computer Publications, 67 Clerkenwell Road, London EC1R 2AU. The competition closes on January 18, 1985, and the first 50 correct entries pulled out of the hat after that date will receive a copy of *Deus Ex Machina*. Employees or associates of Automata or EMAP are not eligible for the competition. Only one entry per contestant is allowed.







Name



Name

Name ....

Address ....

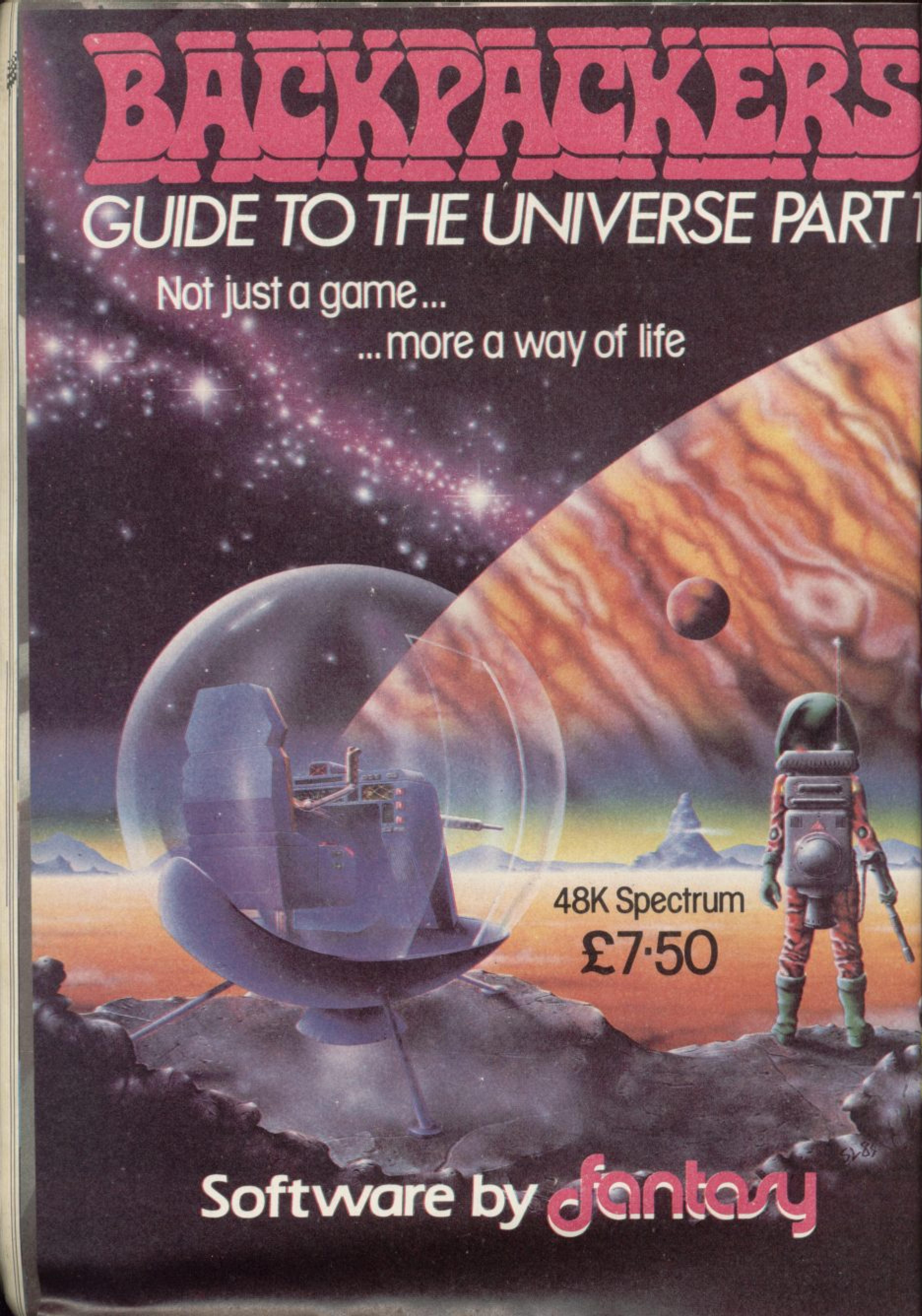
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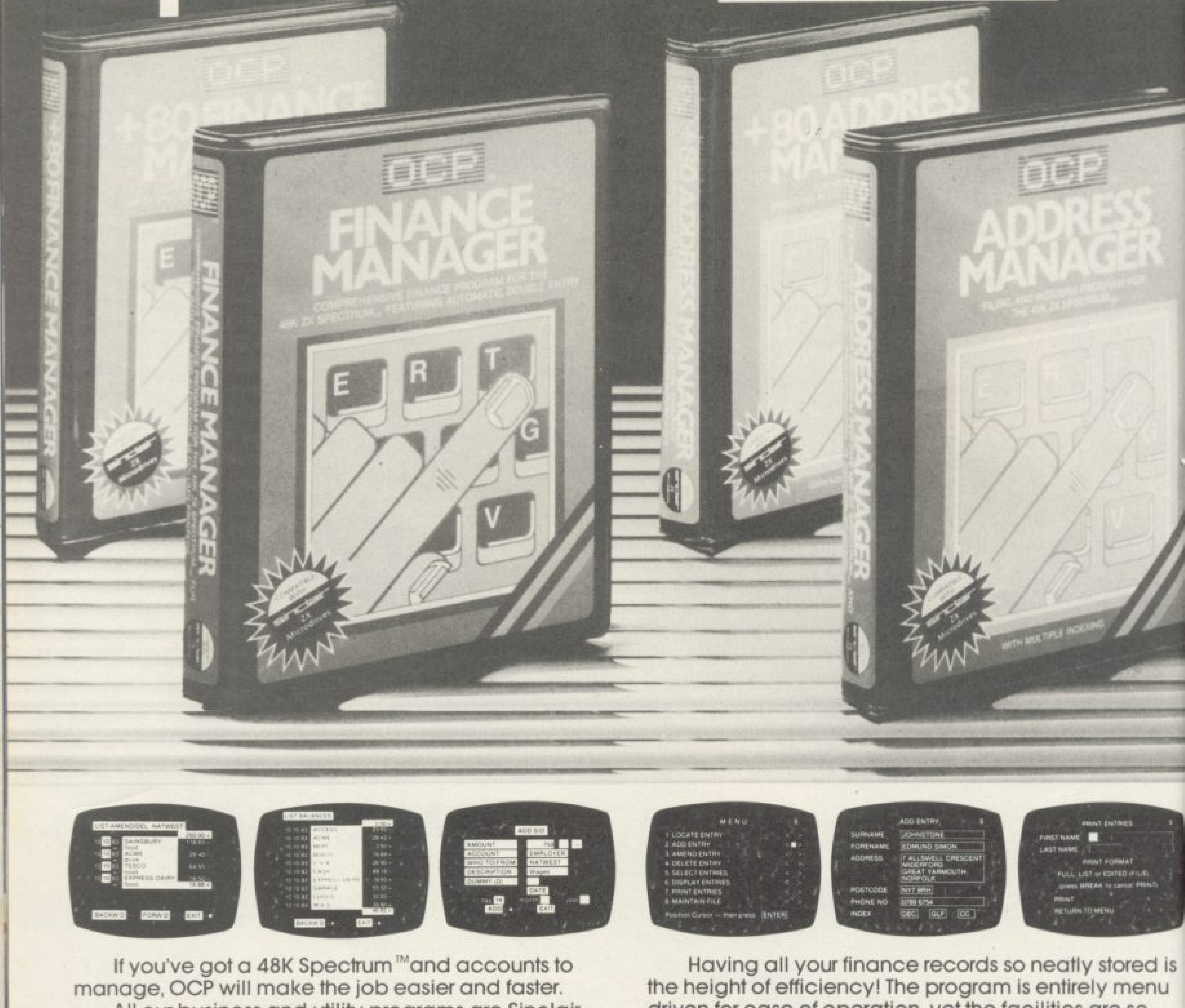
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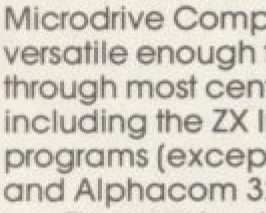
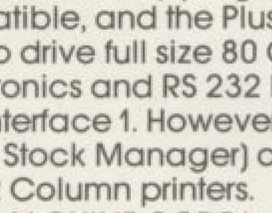
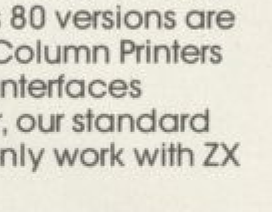
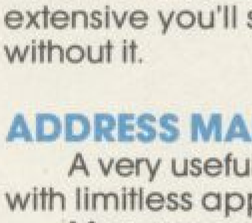

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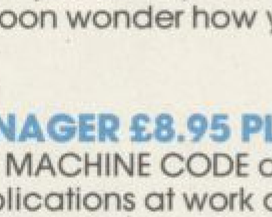


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A British expedition dares to recreate Scott's last journey to the South Pole. Sid Smith asks why they want a QL.



Pole-star QL on Southern Quest

A BRITISH team is planning a year in the Antarctic and the first walk to the South Pole since Scott's 1912 expedition — and is taking a QL.

The five Britons are about to set off on one of the world's worst journeys. They will camp on the Antarctic ice for at least a year in temperatures down to −60 Centigrade, and then two of their number will attempt to walk almost 900 miles to the South Pole, pulling all their supplies behind them on specially designed man sledges.

Throughout their stay, a Sinclair QL will be solely responsible for the management of scientific data, for the production of a book about the expedition, and for the logging of day-to-day radio contact with the two men on their solitary, 85-day journey.

"We chose the QL because it was much the most exciting computer available," says expedition manager William Fenton. "Because it was small, because it was powerful for its size, and because we thought we'd take something adventurous. And because we liked Clive Sinclair."

Their expedition, *In the Footsteps of Scott,* grew from a desire to retrace the historic journey of Robert Scott to the South Pole seventy years ago.



However, the five men have no desire to repeat the ultimately fatal outcome of that earlier trip, and are counting on the best of modern technology — including the QL — to see them through.

"The difficulties of walking 900 miles across the Antarctic are almost insurmountable," says Mike Stroud, the expedition doctor who will be using the QL more than anyone else. "It's only by sticking to a most rigid diet, in the form of calories per ounce, and by using the strongest and lightest modern materials for the equipment, that the men can hope to get through."

Their acqusition of the Sinclair device is only part of the £750,000 worth of sponsorship they have already managed to raise. Products as diverse as Shell oil and Bernard Mathew's turkey breast rolls have been supplied as a result of the highly professional marketing of the expedition, and are now in a warehouse packed with equipment in London's West India Dock.

"Everything here has been given to us," says Dr Stroud, waving an arm over mountains of low-temperature clothing and two years' supply of food. "We started out with nothing. Now we've a ship and all these stores and it's all come from letters and phone calls, and gradually increasing credibility."

In return, the expedition has been able to offer their sponsors the benefit of the most rigorous field testing which any product could ever wish for, and a huge amount of highly desirable free publicity.

"We had a major press conference here a couple of weeks ago, with six TV channels and about fifty newspapers from all over the world. We've had Princess Anne down here on the ship, and we've been on *News at Ten* three or four times."

What about the QL? The expedition members are already making plans for spin-offs they can market after they come home. Apart from a film of their epic journey and an exclusive two year contract with *News at Ten,* they have also acquired a £50,000 advance from publisher Jonathan Cape for a book about the expedition. That book will be written on the Sinclair QL.

"Unfortunately," says Dr Stroud, "none of us have a clue about computers at the moment. But we're counting on the QL being easy to pick up and use, even for a beginner."

The machine will stay in the expedition's base camp and therefore will not be exposed to the hazards of sub-zero temperatures and 100 mph winds.

Dr Stroud explains the scientific uses he plans for the computer. "I have a whole series of observations to perform on the effect of Antarctic conditions on the human physiology.

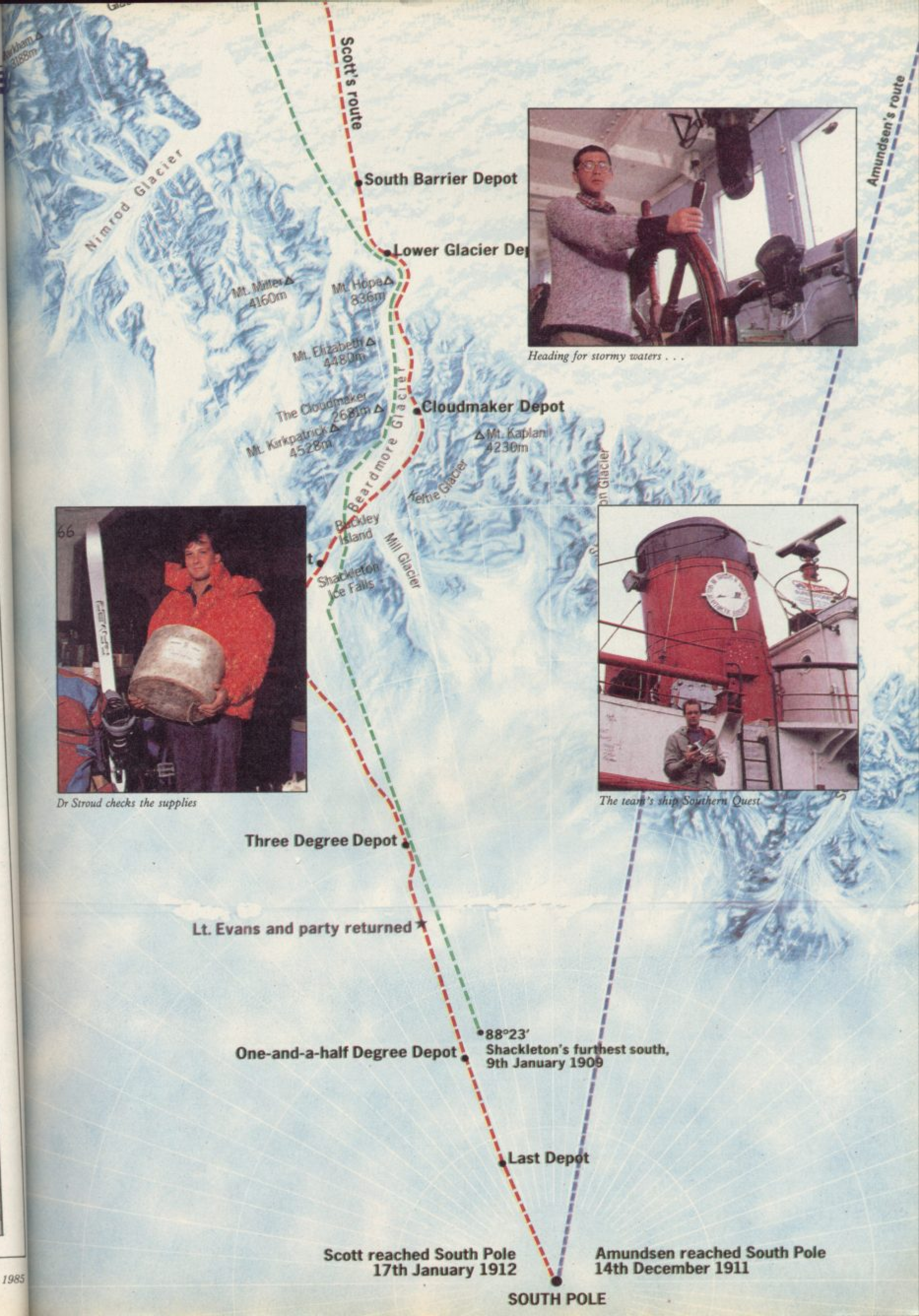
"Obviously, I'll be looking at the changes which take place as a result of low temperatures, but I also want to examine the way the human metabolic rate adapts to changes in the amount of daylight. As the Antarctic day changes between perpetual day and perpetual night, I'll be using the QL to record and manipulate data about alterations in body temperature, in food intake and in sleeping patterns."

Many of those alterations will depend on the effects of the special food and clothing which the expedition will be taking, particularly for the two-man push to the South Pole.

"We've learned a lot from the records kept by members of the disastrous Scott expedition. One of the worst tortures they faced was the way in which perspiration from their bodies passed into their clothing and sleeping bags and then froze, so that they were eventually

continued on page 70





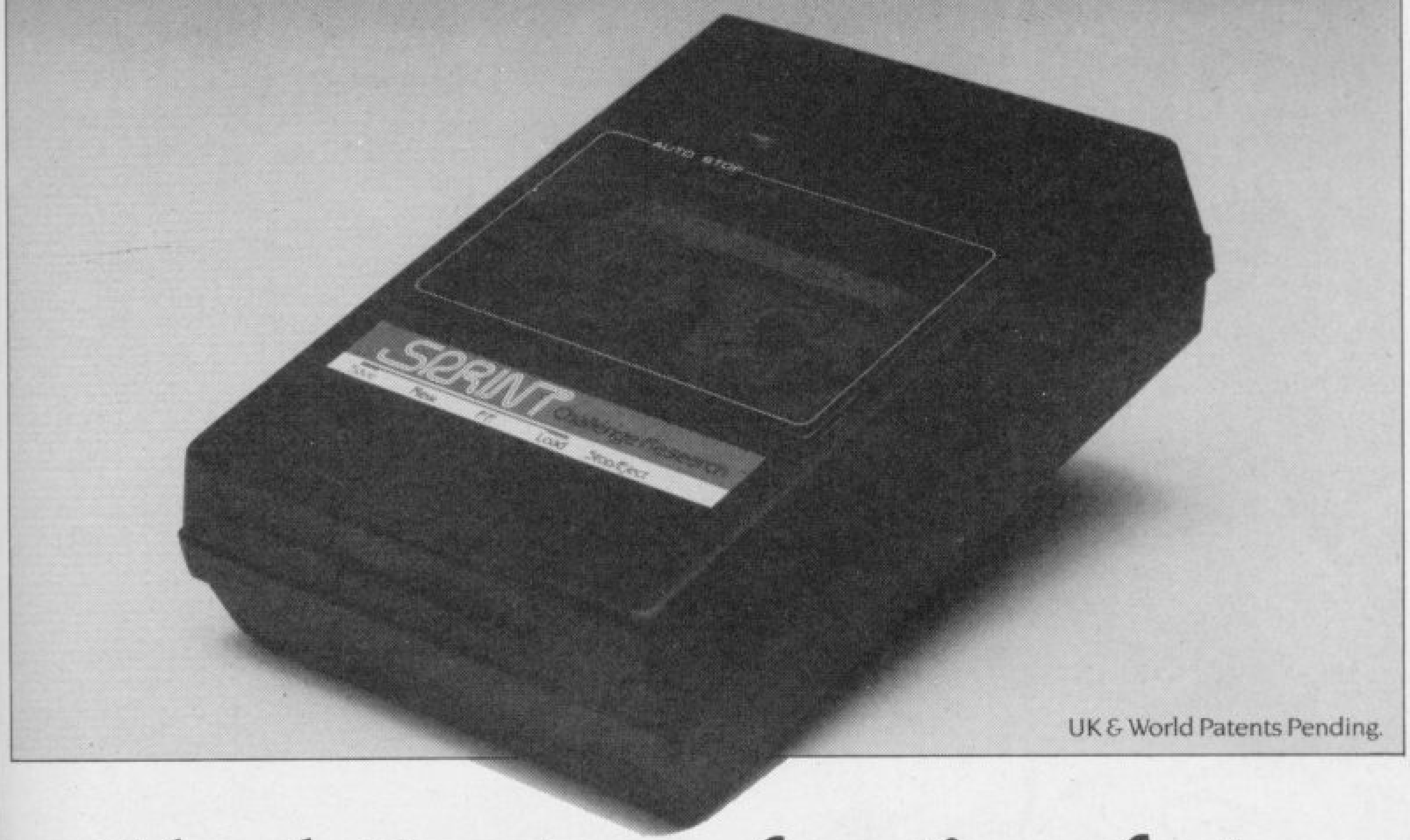
Heading for stormy waters . . .

Dr Stroud checks the supplies

The team's ship Southern Quest

page 70

Introducing the Sprint



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It loads Spectrums four times faster than an ordinary cassette player, uses standard cassette software, and has improved loading reliability. All for just £64.95.

The new Sprint from Challenge Research will load and save Spectrum programs at four times the speed of conventional cassette players, this even applies to standard program and games cassette software that has been pre-recorded at normal speed. All this plus improved loading reliability is available for just £64.95 inclusive of post, packing, VAT and a 12 month guarantee. The Sprint is dedicated to both the 16K and 48K Spectrum and provides an innovative but inexpensive new concept in cassette tape storage.

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- A full 48K program will load or save in 75 seconds rather than five minutes with a conventional cassette recorder.

CHALLENGE RESEARCH

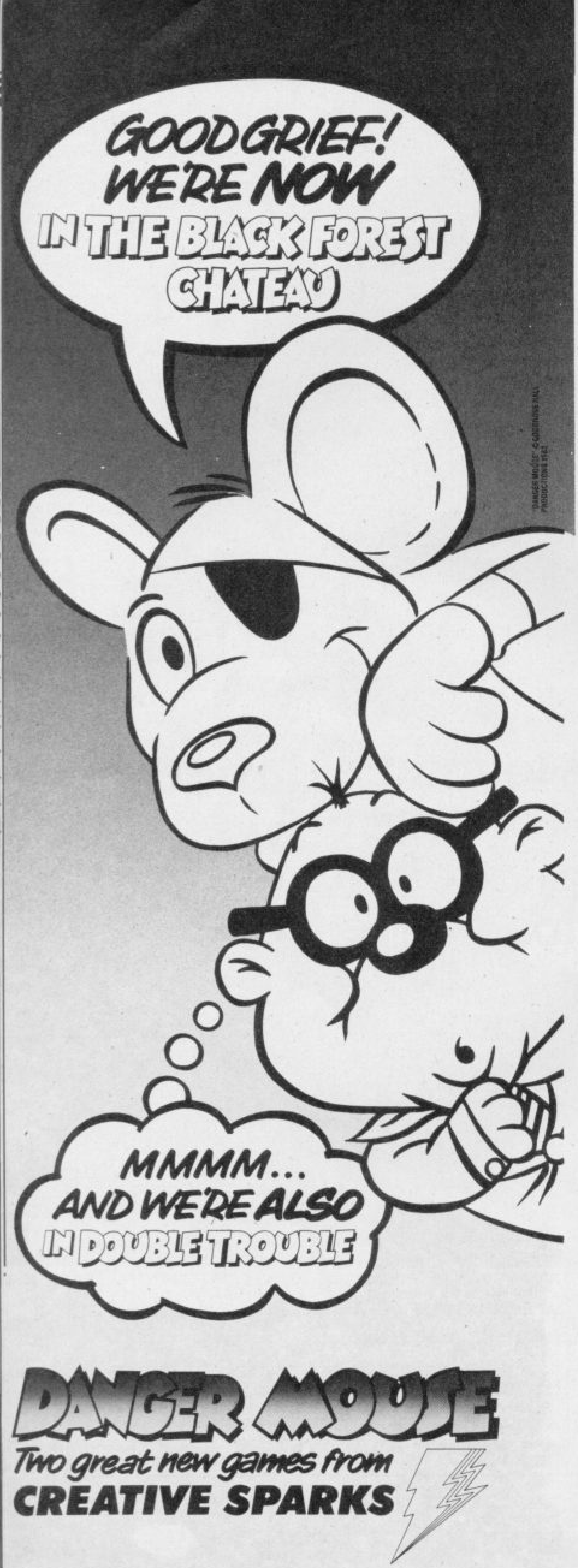
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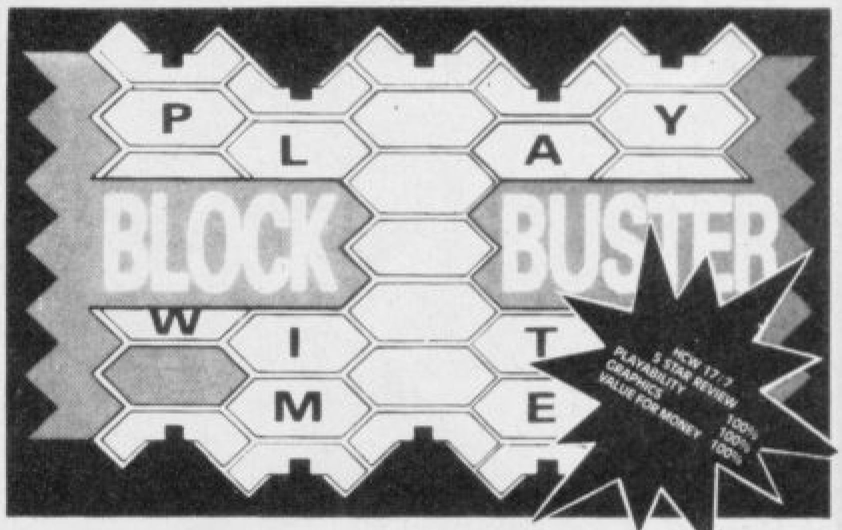
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continued from page 65

carrying many pounds of ice, locked inside the goose down which was intended to protect them."

The expedition hopes to get round that problem through the use of a vapour barrier inside their insulated suits and sleeping bags. Most of the body's moisture will be trapped next to the skin by this barrier, thereby preventing the build-up of ice in their clothing, and helping to prevent dehydration in the arid Antarctic air.

"We'll probably get a bit sweaty," says Dr Stroud, "but that's certainly better than the alternative."

Dr Stroud won't be one of the two men pulling sledges to the South Pole. That dubious pleasure is reserved for Robert Swan and Roger Mead, who between them have clocked up an impressive list of qualifications for the job — things like solo bicycle rides from Cape Town to Cairo, the circumnavigation of the Icelandic ice-cap, and a winter ascent of the north face of the Eiger.

Unlike Captain Scott, they will not have the help of ponies and tractors for any stage of their journey; nor will they be able to rely on periodic stops at pre-arranged supply dumps. Instead, they will make the entire 883 mile journey from base camp to the Pole on their own two feet, pulling behind them two sledges containing every ounce of their supplies.

They will also be uncomfortably aware that since Scott's time, nobody has attempted a walk to the South Pole, and that not one of the Scott party got back alive.

"No, we've got no desire to imitate the Scott expedition too closely," says a member of the present enterprise with a smile. "We've all heard the story of their last days and of Captain Oates who walked off into the snow rather than slow up the expedition."

Nevertheless, their awareness of the tragic precedent for their walk to the Pole is very apparent to an outsider; constant references are made to the superiority of their equipment over that of the 1912 party, and in the galley of the expedition's ship some mordant wit has deliberately mis-spelt the label on their porridge container. "OATES" is what it says.

Even the presence of a Sinclair computer on board owes something to Captain Scott. "Dundee was the big connection here," says William Fenton. "Scott bought his ship there, and we found out that many of the parts for the Sinclair machine are made in Dundee. So we had to get a QL."

The long walk of the two modern explorers will differ from that of Scott and his party in one large way and in a number of small ones.

The large difference is that, unlike Scott and his party, they won't have to walk back. Instead, a ski plane will fly to the South Pole and collect them for the return trip to base.

"For a large part of Scott's walk he was floundering along, sinking to his knees in snow. He did have skis, but they were primitive things which kept falling apart. On our walk to the Pole, though, we'll have the best modern composite skis."

As an insurance policy, each of the two sledges will have enough supplies for both men — in case one of the sledges is lost.

The five men of the expedition will be camped on the Antarctic for a year, much of that time spent isolated from any outside contact. What will they do if their QL breaks down?

"We'll be scuppered," says Dr Stroud.

"No, it won't be as bad as that," laughs William Fenton, "We'll be able to manage by keeping written notes and by using a calculator. We'd certainly be disappointed, though."

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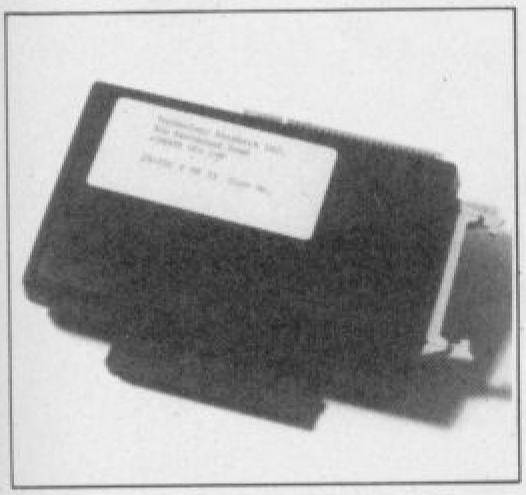
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More memory less labour



In the second of our fast storage reviews, we compare the SPDOS and BETA disc systems

LAST MONTH we looked at tape-based fast storage systems for the Spectrum. This month we turn our attention to discs, one of the first and one of the latest, those from Technology Research and Watford Electronics.

The Spectrum is seen by many people as only a games machine. One of the reasons for that is the limitation of having a cassette interface. The BBC, Commodore and Amstrad can all have disc interfaces designed by the manufacturer; the Spectrum had the microdrive.

That delay caused a number of manufacturers to design disc interfaces for the Spectrum but, as yet, none has been accepted by software houses as a standard. Until that happens users will buy their software on cassette, and then convert it to use on disc.

The Beta system from Technology Research was first reviewed in *Sinclair User* in March 1984. Since then it has undergone a number of improvements and is now the best selling interface on the market. SPDOS from Watford Electronics has been released recently; it has the backing of a company which has made a name for itself by designing and selling interfaces for the BBC.

Both interfaces will accept both 5¼in and 3in drives in 40 or 80 track, single or double-side format. SPDOS can also accept old 35 track drives. Up to four drives can be used but each must have its own power supply as the Spectrum does not have any spare capacity. Many of the drives advertised as suitable for the BBC do not have a power supply and that can cost another £30.00.

The most popular system is 5¼in and discs cost between £1.75 and £3.00 each. The amount of information they can hold will vary according to the drive and the system used to record it. Both interfaces use a form of double density recording; Beta divides each track into 16 sectors of 256 bytes per sector, whereas SPDOS uses 10 sectors of 512 bytes. A 40 track, single-side drive, allowing one track for the directory, gives 156K and 195K respectively.

The speed of a system depends on several things, including the speed of the drive. All discs spin at 300 rpm, five revolutions per second — but the time it takes to move from track to track will vary. Both systems can work at a number of speeds, from 6ms to 30ms for SPDOS and 6ms to 48ms for Beta. The Beta also incorporates a one second delay, if the drive is not spinning, to allow for older, belt-driven drives to reach operating speed.

Another factor is the method of reading the sectors; Beta follows the usual practice of reading alternate sectors, so the disc has to make two revolutions per track, and SPDOS can read the sectors one after the other and so should be quicker.

The Beta interface, unusually, lies flat from the back of the Spectrum, consequently it is compatible with all full-sized keyboards. It has a through port for other add-ons and is compatible with both the Kempston E printer interface and Sinclair Interface 1. On the right is the connector for the disc drives, which follows the same standard as the BBC and has been successfully used with a BBC drive. To the left is a socket for the Spectrum power supply.

On power up you are presented with the copyright notice and an invitation to enter a password. This is the only system which uses passwords, which can be any combination of characters; if you are forgetful you could give all your discs a password corresponding to the ENTER key and so you need only press that in response to the prompt.

You are then into the DOS — Disc Operating System — and presented with:

A>

to remind you that you are in the DOS and that the default drive, the one to which all commands will relate, is the A, or number 1, drive. You can now use any of the DOS commands directly or enter Y to RETURN to BASIC. You can return to the DOS at any time by entering RAND USR 15360 but that is rarely needed.

All the normal Spectrum tape commands, apart from VERIFY, can be used by the disc: the command is simply preceded by RAND USR 15363: REM:. If PRINT USR or LET variable=USR is used then the number returned will be the error message, 0, meaning no error. Calculated parameters or variables can be used as with the tape command.

There are only two variations: by adding a third parameter when saving CODE it can be made to auto-run, and then RUN, rather than LOAD, must be used to auto-run a program. That applies to both CODE and BASIC. When LOADing and SAVEing if the second character of the file name is a colon and the first is A, B, C or D then the command is taken to apply to that drive. That is a useful way to avoid changing the default setting.

The commands that relate only to the drive are ERASE, which will erase a file, CAT, to obtain a catalogue, USR, which can be used to change the password on the disc and NEW, to change the name of a file. MOVE has a special use. When the system saves information to the disc it is stored, in the interests of speed, in successive sectors; when files are erased gaps are left and MOVE simply moves the files up to fill the

continued on page 76



Herbie Briggs has just destroyed the myth that all floppy discs are created equal.

They seem equal. Until you look at the seams.

That's where equality ends.

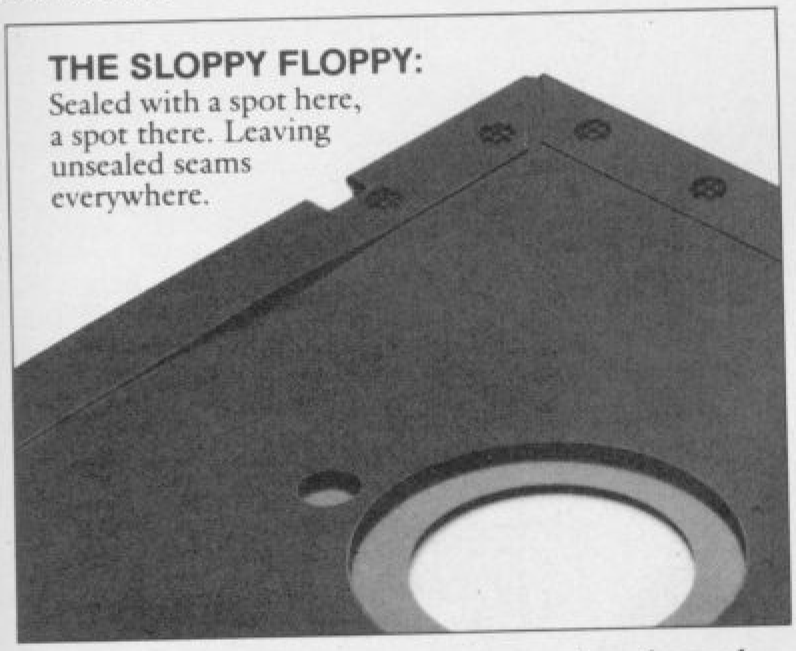
Most companies seal their discs with a spot here, a spot there. Leaving most of each seam not sealed at all.

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MEMOREX

continued from page 73

space. PEEK and POKE can be used to randomly read information from, and send it to, the disc. To change the default drive *"x:" is used where x is the drive. All those commands must have the usual prefix.

The utility disc supplied with the system contains two other commands: FORMAT, to format the disc, give it its password and an identifying name; and COPY to copy a single file or the whole disc in one go. If you have only one drive then prompts are given to swop the discs.

The instruction booklet gives examples of each of the commands and is written with the novice in mind. Details are also included on how to use the system from within your own machine code programs. The assembly listing included for that contains an error, having the line LD (nn),nn, which must be changed to include a register. The index at the back lists the commands, error messages and pin-outs.

The SPDOS, unlike the Beta interface, sits up vertically from the back of the Spectrum. It has a through port for add-ons but is not compatible with Interface 1. The lead for the disc is connected on the right hand side, using a disc connector ontô the PCB, like the TRS80. On the top at the front is a LED and a reset button. The lead for the power supply has to be threaded through a hole in the interface. It will fit most full-sized keyboards, the only exception being the Transform which is rather high at the back.

Powering up, or pressing the reset button, automatically loads the operating system into memory. If a program has been saved with the name "AUTO", in upper case, then that will also be loaded. If the program is in BASIC and was saved using LINE then it will auto-run. CODE will auto-run from its first address.

As with the Beta all the normal tape commands can be used in the usual way, apart from MERGE which will always auto-run. To make them relate to the disc they must be preceded by PRINT #4:.

The commands that relate to the disc, which must also use the PRINT #4 prefix, are: CAT, to obtain a catalogue — this can be followed by a string so that only those files containing the string are listed; CLEAR which performs a block delete; ERASE to erase a file — this includes a wild-card facility where ∧ can stand for any character; MOVE renames files or can be used to copy them.

SPDOS supports sequential files and a number of commands are used for that: OPEN # and CLOSE # are used to open and close files; PRINT # sends information while INPUT # and INKEY$ # are used to read it back. To use FORMAT the original system disc has to be in the current drive. That gives the disc its identifying name. Unlike the Beta system errors are returned as a Basic error message.

The system disc contains two other system utilities. The first of those is "copysys", a program which will copy the system, except for FORMAT, to another disc — necessary if you want to use CAT on the other disc. The other program is "minidos", a stripped down version of the system which does not, as far as is apparent, include the sequential access commands. Also on the disc is a simple address book program which shows the use of sequential files plus three commercial programs, **Tasword II, Masterfile** and **Omnicalc 2.** Those have been converted to use the system and include demonstration data.



Choosing between the two systems will depend entirely on what you want to use a disc system for. Both are very quick; using the same test program as last month that is,



```
10 FOR n=1 TO 30
20 SAVE ("test"+STR$n) CODE
32000,200
30 NEXT n
```

— and changing line 20 to suit the system, SPDOS took 58 seconds in saving, 23 loading and 29 erasing while the Beta took 55, 33 and 47 respectively. Formating depends on the number of tracks and sides; with an 80 track, single side disc SPDOS took 2 min 43 seconds and Beta 1 min 10 seconds.

If you only want to write your own programs then SPDOS with its overlays, sequential access and faster loading times has the edge.

If you also want to put your favourite commercial programs on disc then the Beta system is more suitable, unless you are into machine code. The system occupies just 112 bytes of memory below the Basic program area; it also uses the printer buffer when loading code but when doing so it saves the buffer to the disc, carries out the command, and then reloads the buffer.

Both systems allow for a large number of directory entries, Beta 128, and SPDOS 144. With the latter you have more space per disc. Both require additions to the commands, the syntax for SPDOS being slightly easier to enter from the keyboard. Both sell for similar prices, Beta £99.00 inclusive, SPDOS £99.00 plus VAT.

The winner in the contest between the disc drives will be the one which receives most software support. Both companies claim to be talking to software houses. In the meantime more systems are due to be launched. Next month we look at those, including the new system from Thurnell Electronics, priced at only £150.00 for both interface and drive.

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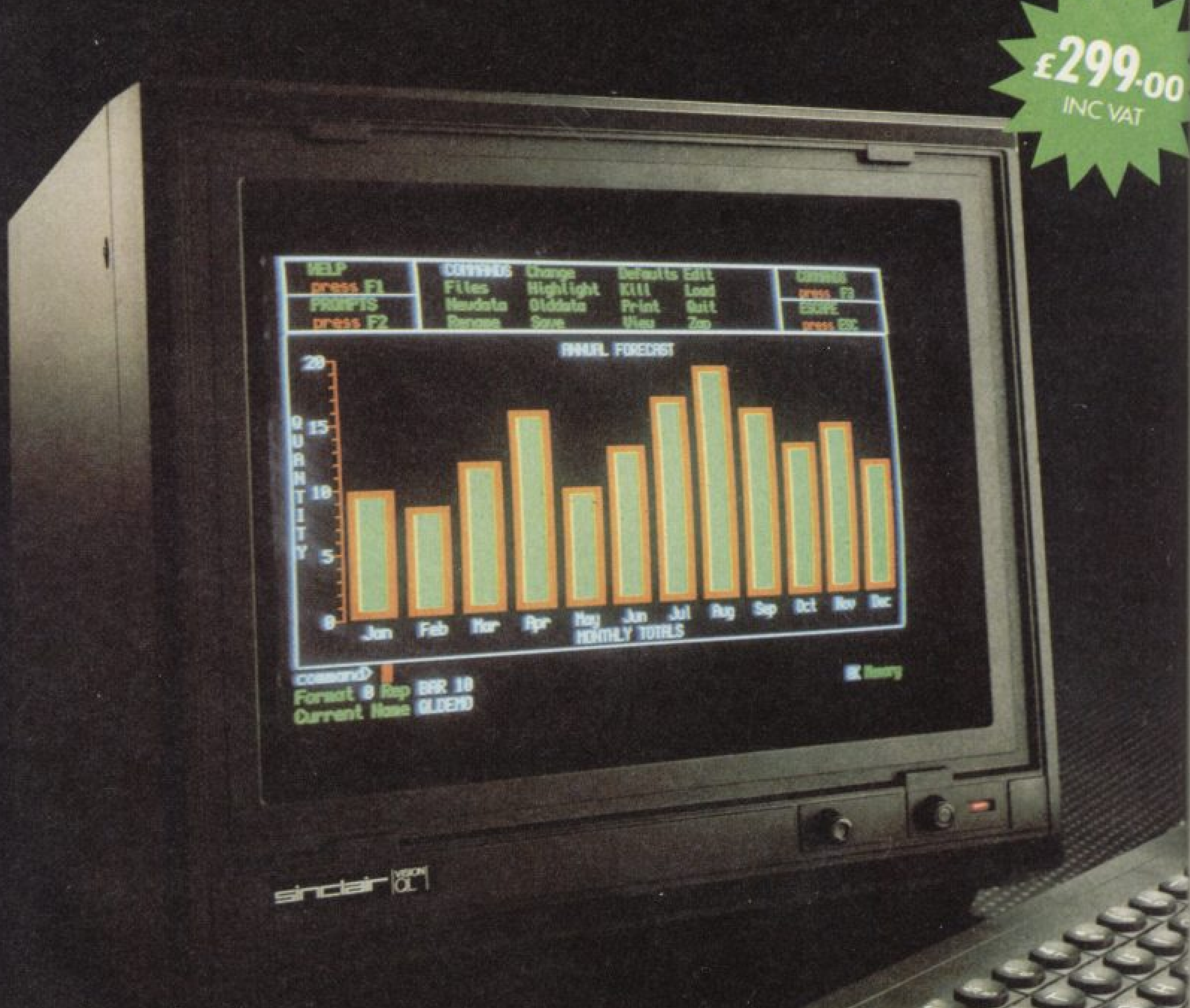
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Psion Chess: Queen of the chequered board

QL CHESS is the most powerful game available for the QL and, not surprisingly, is produced for Sinclair Research by Psion.

The most remarkable attribute of the package, according to Psion, is its three-dimensional representation of board and pieces. Although, on first sight, those graphics seem complex the 3D representation has been created with the minimal amount of effort by putting the board into 3D perspective. When one piece takes another it moves in front of it but when the knight, for instance, advances over a piece it moves behind.

The display is effective and watching the computer play through a demonstration will show you what can be achieved by a programmer who is more than competent on the QL.

QL Chess also has the attraction of being one of the fastest computer chess programs on the market. In Level Zero Novice Mode, for instance, it can make more than seven moves in less than a second.

The program supports a normal, birds-eye view, representation of the chess board. Psion has made the format of the display similar to the one used in its suite of business programs for the QL. The options and commands are shown at the top of the screen, the conventional view of the board at middle-right and a list of moves which are scrolled up middle-left. The list of moves can be output to a printer which will then keep a hard copy of the game as it progresses. In that way you will be able to see where you went wrong in a game or, in demo mode, how to improve your standard of play.

As our copy of the program was a preview version there were bound to be some disappointments. The major one involved the 3D screen display where the commands and options were not listed. A good memory is required if you do not want to keep moving back to the overhead 'flat' representation. Psion could have made the board smaller and incorporated a command/option panel at the bottom of



the screen which would have made switching between options easier.

There are 12 levels of play which can be interchanged at any time during a game, except when the computer is thinking about a move. The first level is Zero and has been designated for the novice by the authors. It produces a simple but robust game and makes its opening move in a fraction of a second.

Any beginner will be more than flustered by the speed at which moves are made. Psion has come close to the precipice of unplayability. We are sure that the game could hold a record as one of the fastest chess games around.

The other levels range from one to 11. Level One plays at two minutes a move and Level 11 at a maximum time limit of four minutes. Above those levels Equal Time makes the computer move within the time last made by the human player and Infinite Time lifts all the restrictions of the clock. There is also a Wait option available to the human player which suspends the game. That will be useful if cheating on the clock is required.

Once you have set up the display and level to your satisfaction you can start a new game by pressing $. All the pieces are put into their initial positions and the clock starts ticking away.

Movement on the normal and 3D boards is accomplished in different ways. During 'flat' representation a cursor is moved, using the cursor keys, to a chosen piece and the ENTER key is pressed. The cursor is then moved to the new position of the piece which is then deposited on the square.

The 3D representation provides a cross-hair which is shifted using the cursor keys and which acts in the same way as the 'flat' cursor. Movement could not be easier and the list of moves is tabulated in algebraic notation. No need to enter those long formulae when you want to make a move.

If you make a move of which you are not proud you can take back the piece before the computer makes fun of your folly. There are other ways of cheating. The first, and simplest, is to use Hint which will tell you the move the computer would make in your place. It is also possible to make the QL take back the best move it can make and substitute the next best. In that way the QL can be forced to play a second-rate game and you could come out on top.

Psion has also built an option into the game which allows you to see the strategy the QL is taking. The Analysis option displays the moves which the computer considers before making its final choice and it will give you some idea of the patterns being created in the game.

QL Chess is likely to take a well-deserved place in the history of computer chess. It could rank with such names as Sargon and Sci-Sys which, undoubtedly, it could outplay if only in terms of speed.

The QL is an ideal chess machine and the software which Psion authors have written to maximise its powers is state of the art. The game's prowess has already been demonstrated at the European Chess Championships in Scotland and its usefulness to someone seriously interested in chess is undeniable. It can beat the masters.

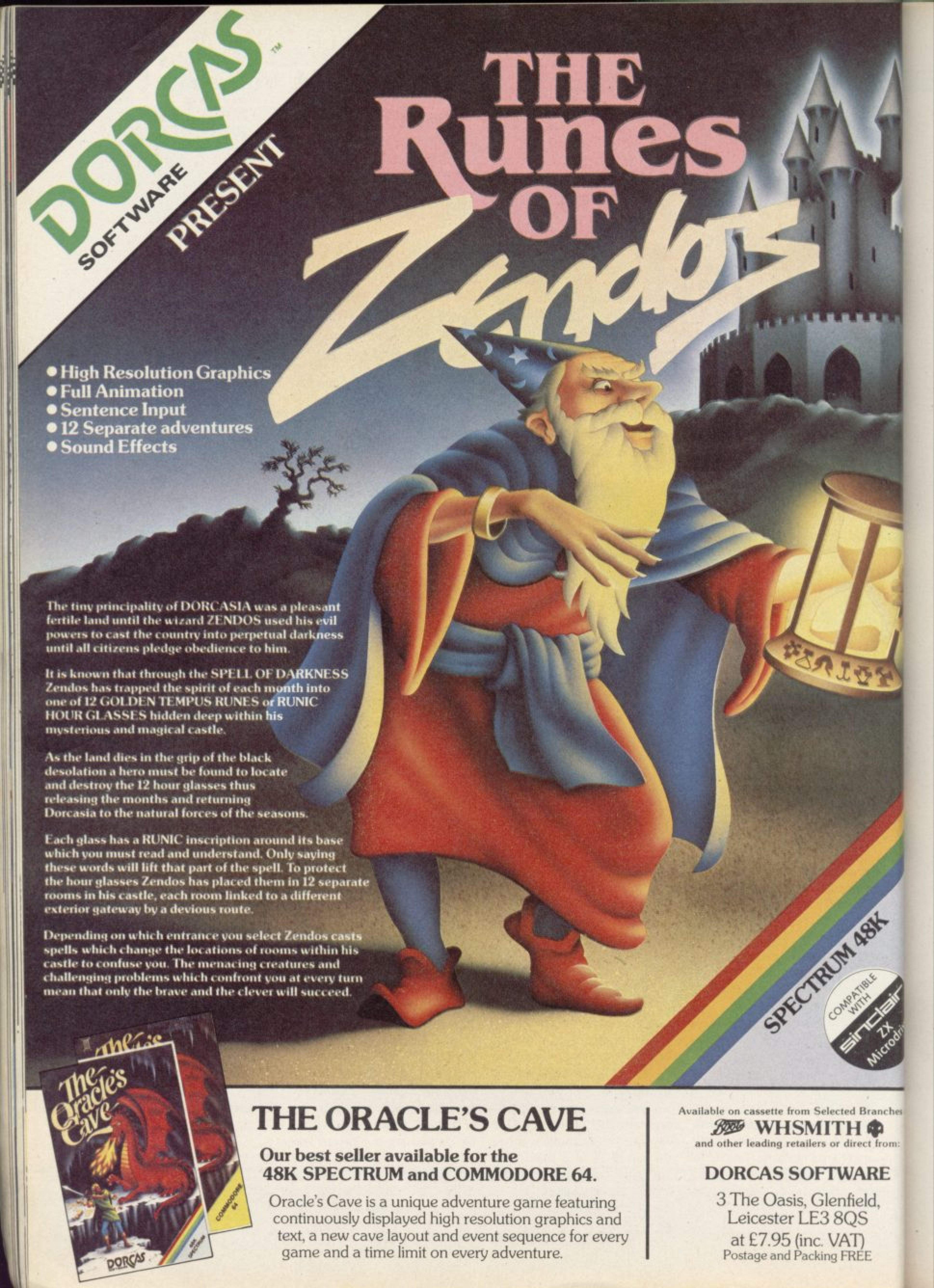
Psion has also thought of the beginner. There is a full set of Help routines within the program. These should answer most queries of a technical or general nature.

If you own a QL then QL chess should certainly occupy a place in your software library, even if it keeps giving you a sound thrashing. The style and quality of the product would make it attractive at double the outlay.

It is also the first program which QLUB members will get at a discount price. The discount alone makes membership worthwhile.

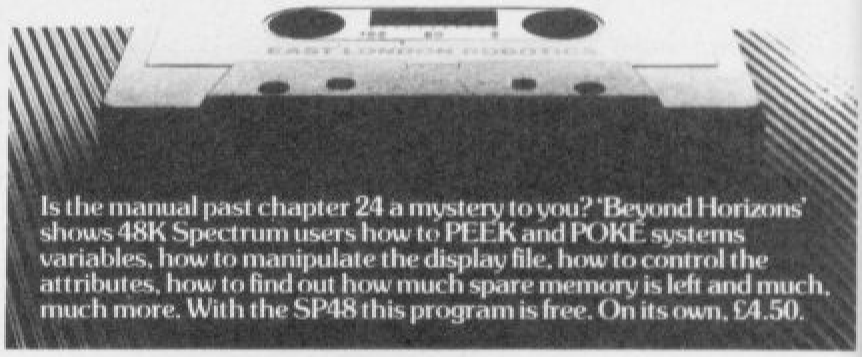
John Gilbert

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48/80 FORTH

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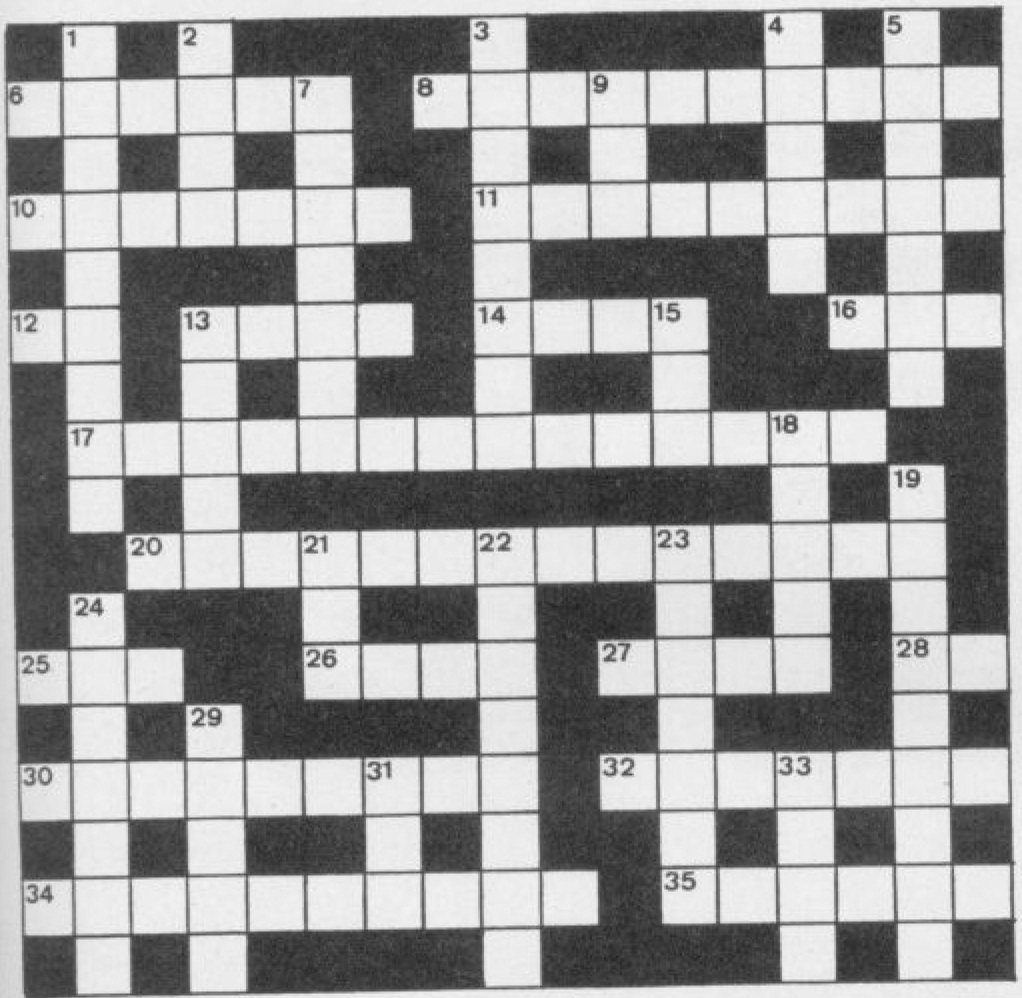
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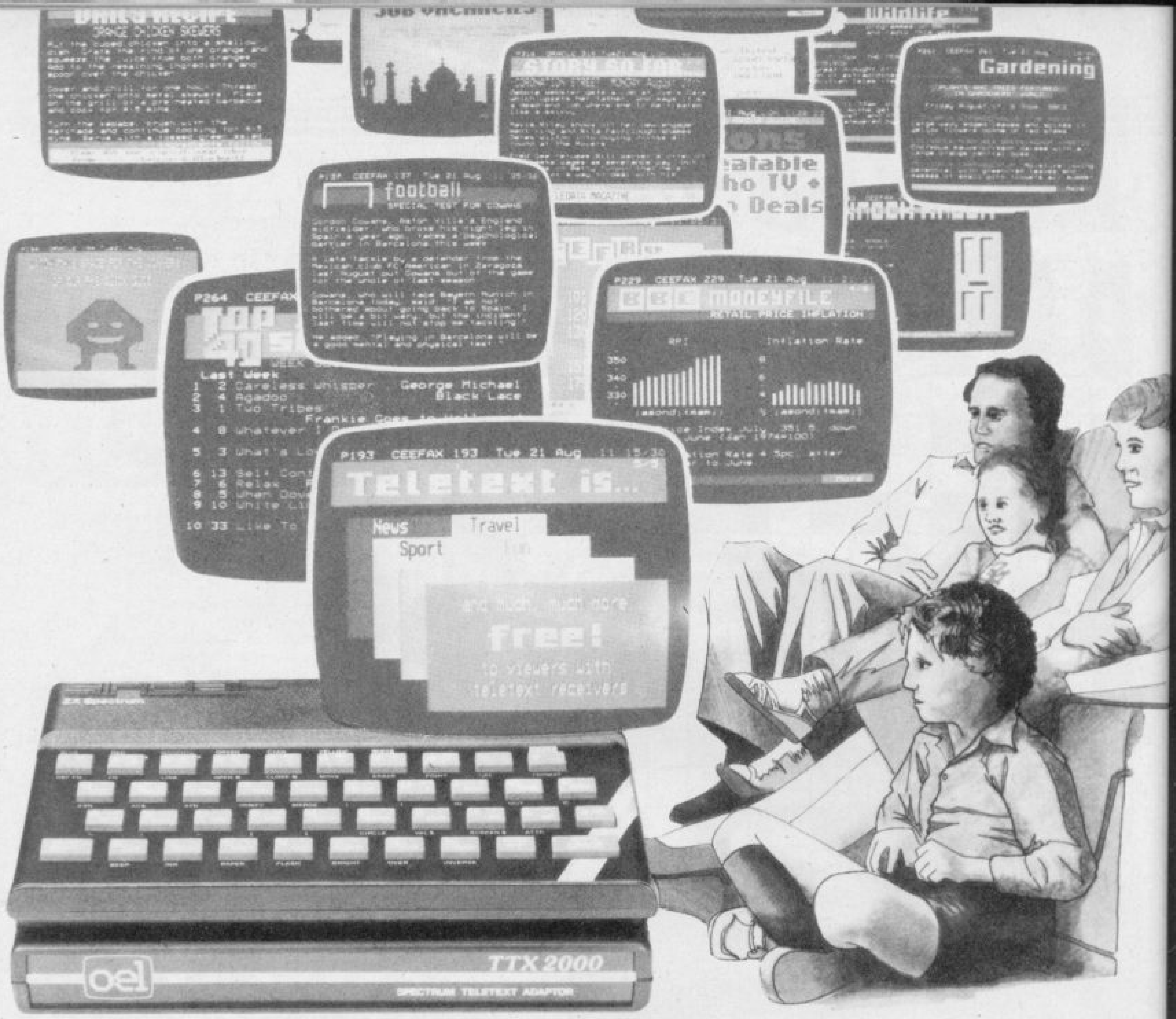
ACROSS

6. The serious sounding micro (6)
8. Famous school gets hard disc drive (10)
10. Confusion over sin in a variety of language (7)
11. Screen speed or what the writer ate apparently (5,4)
12. Ten operations between hardware units (1,1)
13. Little piece of card punched out in Africa (4)
14. A real part of memory (4)
16. Small cathode ray tube? (3)
17. Methodical shrink employed in the computer industry? (7,7)
20. Slang, perhaps, understood by more than one computer (6,8)
25. Rush to execute a program (3)
26. Synchronization in the beginning (4)
27. Basically, keep the program (4)
28. Have real fun, initially, on the airwaves (2)
30. mV (9)
32. Move the editor when moved on screen (7)
34. Determination needed to produce 23s (10)
35. Sounds like we see facts on BBC (6)

DOWN

1. Interference on the telephone (4,5)
2. Pieces of binary (4)
3. See information on Prestel, for example (8)
4. Are they addicted to computers? (5)
5. Reset or otherwise refresh (7)
7. Or gates designed for memory (7)
9. Training organised by the C.I.A.? (3)
13. Occasion to reveal calculator company (5)
15. Language used with incomplete apple (3)
18. Room for invaders (5)
19. Fetching—like gun dogs? (9)
21. A capital metal oxide semiconductor (3)
22. A memorable place for filming, possibly (8)
23. Vivid description of display? (7)
24. Ace computer company from another planet (7)
29. All go crazy about this language (5)
31. Garbage in, garbage . . . stumped! (3)
33. Eat cards and paper tape (4)

Solution on page 192



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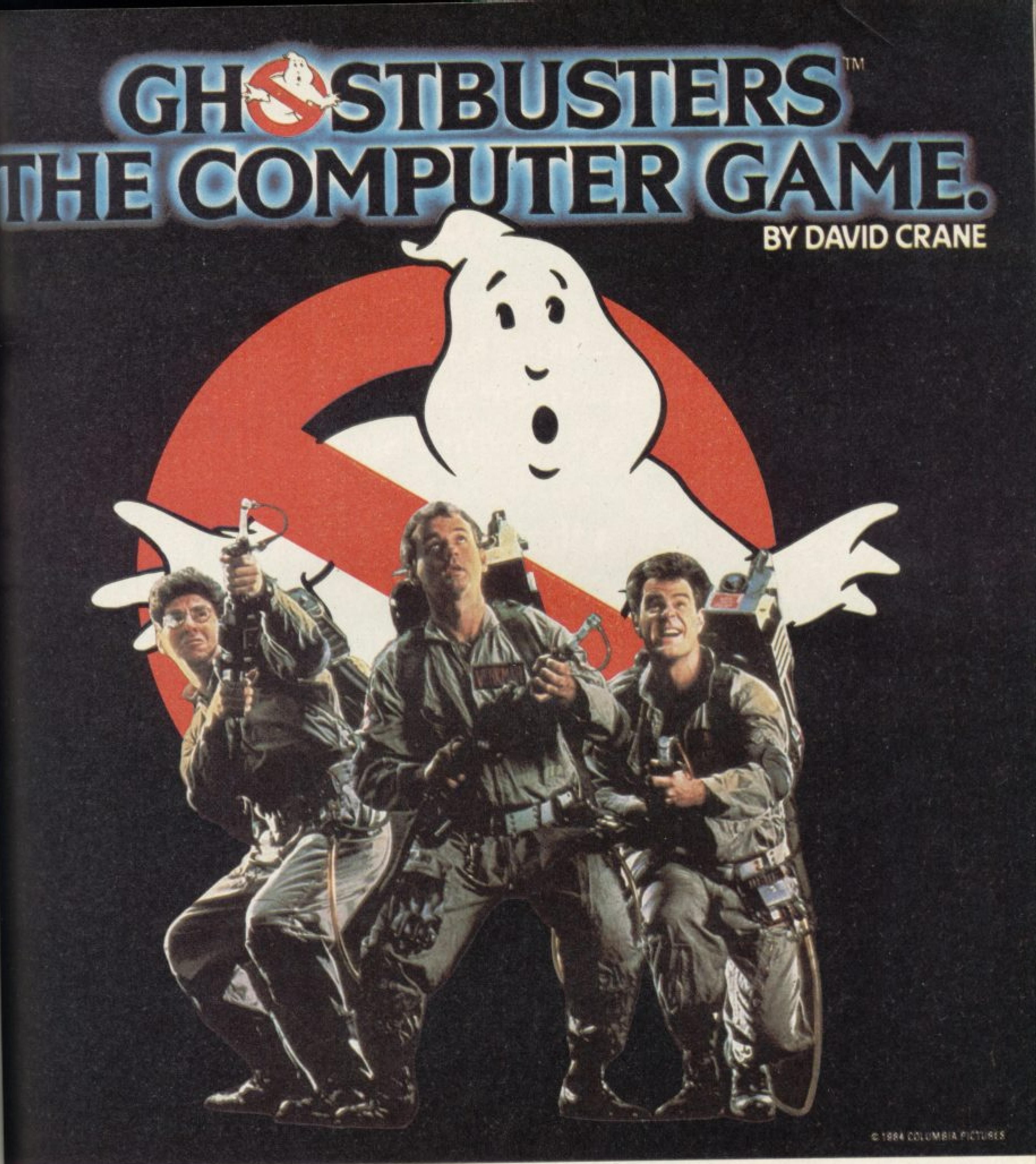
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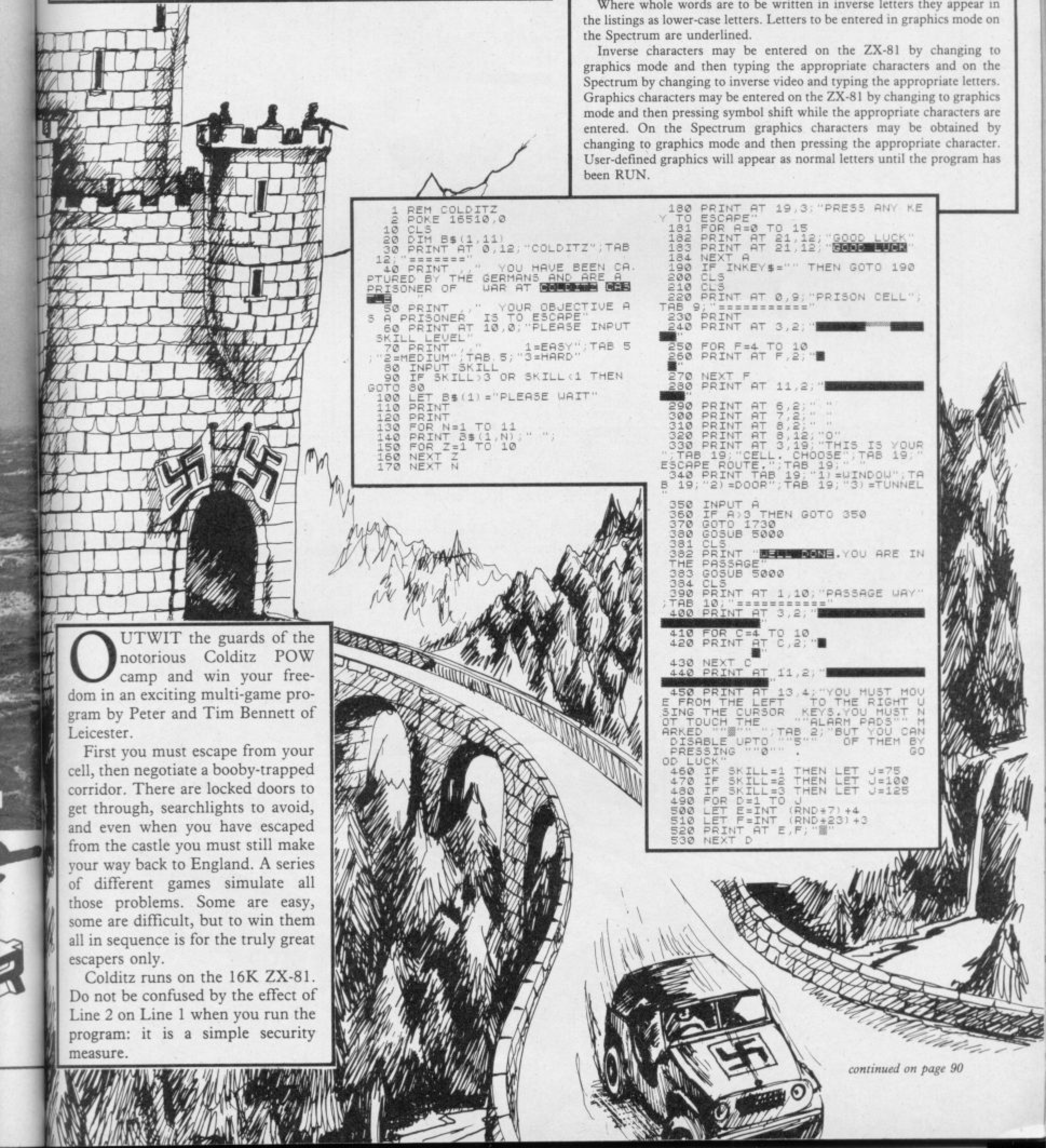
Instructions for graphics characters are printed in lower-case letters in our listings. They are enclosed by brackets and separated by colons to distinguish them and the brackets and colons should not be entered.

Inverse characters are represented by the letter "i" and graphics characters by "g". Thus an inverse W would be represented by "iw", a graphics W by "gw", and an inverse graphics W by "igw".

Spaces are represented by "sp" and inverse spaces by "isp". Whenever any character is to be used more than once, the number of times it is to be used is shown before it, together with a multiplication sign. Thus "6*isp" means six inverse spaces and "(g4:4*i4:g3)" would be entered as a graphic four, followed by an inverse four repeated four times, followed by a graphics three. Control codes appear with cc before the appropriate key. The are obtained by pressing Caps Shift while in Extended mode.

Where whole words are to be written in inverse letters they appear in the listings as lower-case letters. Letters to be entered in graphics mode on the Spectrum are underlined.

Inverse characters may be entered on the ZX-81 by changing to graphics mode and then typing the appropriate characters and on the Spectrum by changing to inverse video and typing the appropriate letters. Graphics characters may be entered on the ZX-81 by changing to graphics mode and then pressing symbol shift while the appropriate characters are entered. On the Spectrum graphics characters may be obtained by changing to graphics mode and then pressing the appropriate character. User-defined graphics will appear as normal letters until the program has been RUN.



OUTWIT the guards of the notorious Colditz POW camp and win your freedom in an exciting multi-game program by Peter and Tim Bennett of Leicester.

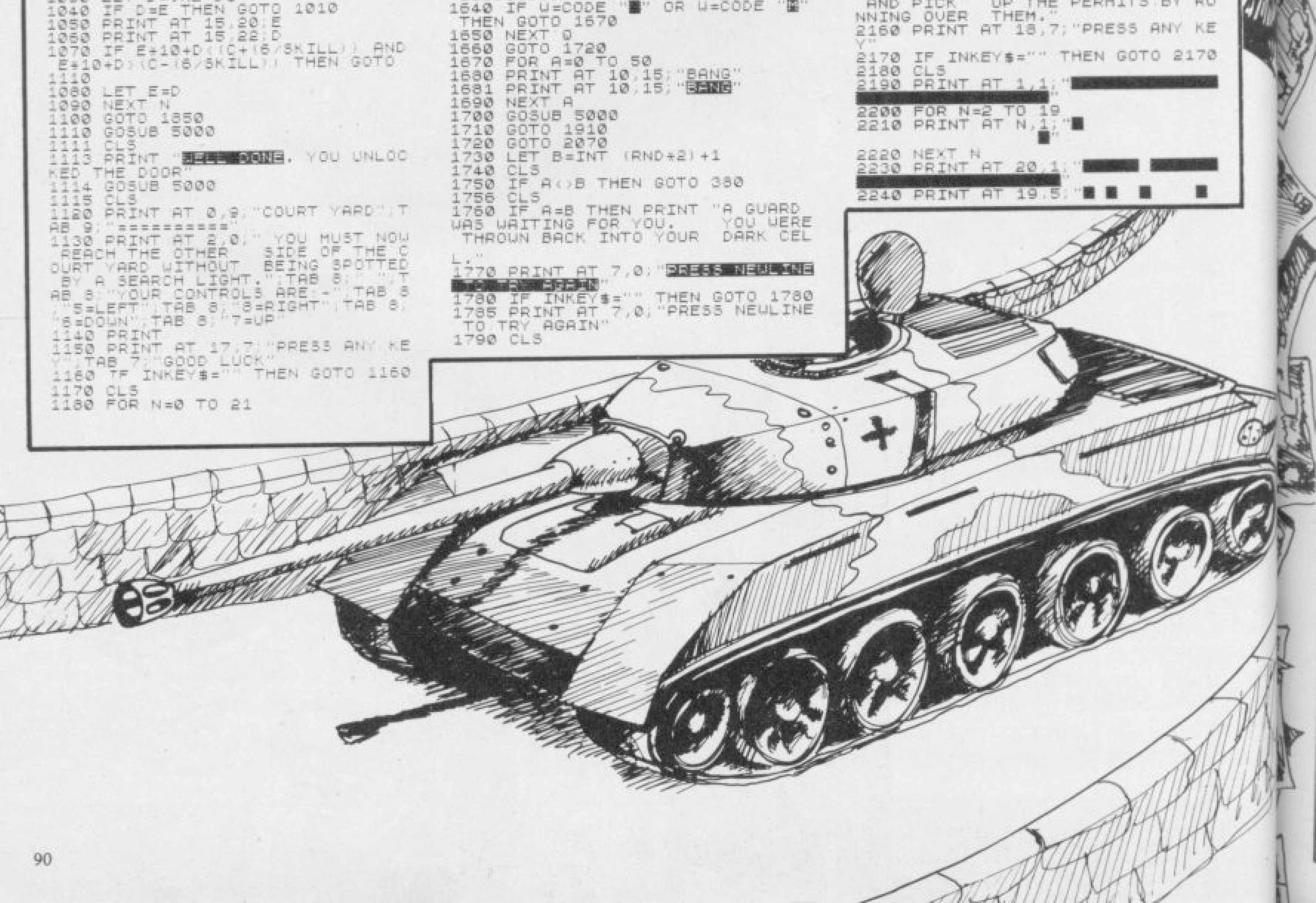
First you must escape from your cell, then negotiate a booby-trapped corridor. There are locked doors to get through, searchlights to avoid, and even when you have escaped from the castle you must still make your way back to England. A series of different games simulate all those problems. Some are easy, some are difficult, but to win them all in sequence is for the truly great escapers only.

Colditz runs on the 16K ZX-81. Do not be confused by the effect of Line 2 on Line 1 when you run the program: it is a simple security measure.

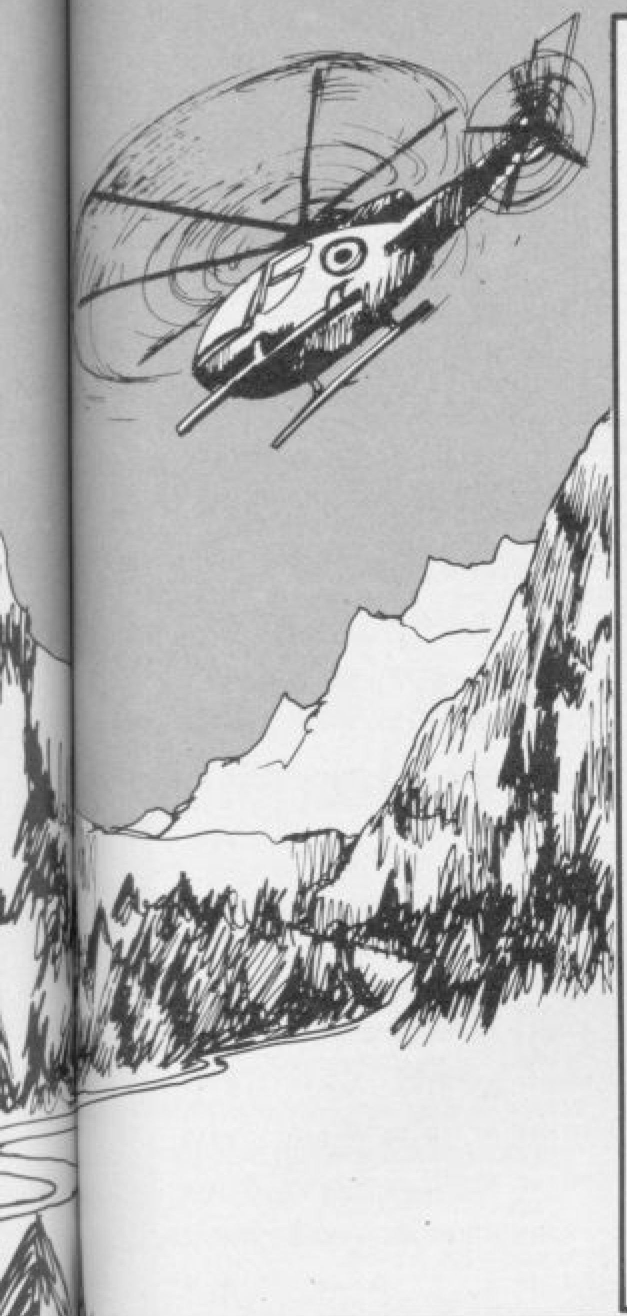
```
   1 REM COLDITZ
   2 POKE 16510,0
  10 CLS
  20 DIM B$(1,11)
  30 PRINT AT 0,12;"COLDITZ";TAB
 12;"========"
  40 PRINT ,,"  YOU HAVE BEEN CA
PTURED BY THE GERMANS AND ARE A
PRISONER OF   WAR AT COLDITZ CAS
TLE  "
  50 PRINT ,,"  YOUR OBJECTIVE A
S A PRISONER  IS TO ESCAPE"
  60 PRINT AT 10,0;"PLEASE INPUT
 SKILL LEVEL"
  70 PRINT ,,"      1=EASY";TAB 5
;"2=MEDIUM";TAB 5;"3=HARD"
  80 INPUT SKILL
  90 IF SKILL>3 OR SKILL<1 THEN
GOTO 80
 100 LET B$(1)="PLEASE WAIT"
 110 PRINT
 120 PRINT
 130 FOR N=1 TO 11
 140 PRINT B$(1,N);" ";
 150 FOR Z=1 TO 10
 160 NEXT Z
 170 NEXT N
 180 PRINT AT 19,3;"PRESS ANY KE
Y TO ESCAPE"
 181 FOR A=0 TO 15
 182 PRINT AT 21,12;"GOOD LUCK"
 183 PRINT AT 21,12;"GOOD LUCK"
 184 NEXT A
 190 IF INKEY$="" THEN GOTO 190
 200 CLS
 210 CLS
 220 PRINT AT 0,9;"PRISON CELL";
TAB 9;"==========="
 230 PRINT
 240 PRINT AT 3,2;"███████  ████
██"
 250 FOR F=4 TO 10
 260 PRINT AT F,2;"█
█"
 270 NEXT F
 280 PRINT AT 11,2;"████████████
██"
 290 PRINT AT 6,2;" "
 300 PRINT AT 7,2;" "
 310 PRINT AT 8,2;" "
 320 PRINT AT 8,12;"O"
 330 PRINT AT 3,19;"THIS IS YOUR
";TAB 19;"CELL. CHOOSE";TAB 19;"
ESCAPE ROUTE.";TAB 19;" "
 340 PRINT TAB 19;"1)=WINDOW";TA
B 19;"2)=DOOR";TAB 19;"3)=TUNNEL
"
 350 INPUT A
 360 IF A>3 THEN GOTO 350
 370 GOTO 1730
 380 GOSUB 5000
 381 CLS
 382 PRINT "WELL DONE.YOU ARE IN
THE PASSAGE"
 383 GOSUB 5000
 384 CLS
 390 PRINT AT 1,10;"PASSAGE WAY"
;TAB 10;"==========="
 400 PRINT AT 3,2;"██████████████
█████████████"
 410 FOR C=4 TO 10
 420 PRINT AT C,2;"█
             █"
 430 NEXT C
 440 PRINT AT 11,2;"█████████████
██████████████"
 450 PRINT AT 13,4;"YOU MUST MOV
E FROM THE LEFT   TO THE RIGHT U
SING THE CURSOR  KEYS.YOU MUST N
OT TOUCH THE    ""ALARM PADS"" M
ARKED ""▒"" ";TAB 2;"BUT YOU CAN
 DISABLE UPTO ""5""    OF THEM BY
 PRESSING ""0"" .            GO
OD LUCK"
 460 IF SKILL=1 THEN LET J=75
 470 IF SKILL=2 THEN LET J=100
 480 IF SKILL=3 THEN LET J=125
 490 FOR D=1 TO J
 500 LET E=INT (RND*7)+4
 510 LET F=INT (RND*23)+3
 520 PRINT AT E,F;"▒"
 530 NEXT D
```

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```
540 SLOW
550 LET O=0
560 LET G=4
570 LET H=3
580 LET G1=G
590 LET H1=H
600 IF INKEY$="8" THEN LET H=H+
1
610 IF INKEY$="7" THEN LET G=G-
1
620 IF INKEY$="6" THEN LET G=G+
1
630 IF INKEY$="5" THEN LET H=H-
1
640 IF INKEY$="0" AND O<6 THEN
PRINT AT G,H+1;" "
650 IF INKEY$="0" THEN LET O=O+
1
660 IF G=3 THEN LET G=G+1
670 IF G=11 THEN LET G=G-1
680 IF H=2 THEN LET H=H+1
690 LET I=PEEK 16396+256*PEEK 1
6397+1
700 PRINT AT G1,H1;" "
710 LET POS=PEEK (I+33*G+H)
720 IF H=26 THEN GOTO 760
730 IF POS=CODE "▒" THEN GOTO 1
810
740 PRINT AT G,H;"P"
750 GOTO 580
760 GOSUB 5000
761 CLS
762 PRINT "WELL DONE.YOU ARE AT
THE LOCK"
763 GOSUB 5000
764 CLS
770 PRINT AT 0,12;"LOCK";TAB 12
"===="
780 PRINT AT 3,1;"AT THE OTHER
SIDE OF THIS DOOR IS A COURT YAR
D,YOU MUST CROSS  THIS,BUT FIRST
,YOU MUST UNLOCK  THE DOOR,
                  THE NUMBER IS
BEWEEN 10 AND 100 IT HAS NO SIMI
LAR DIGITS        SO,""33"" CANN
OT OPEN IT"
810 PRINT ,,,,"PRESS ANY KEY TO
CONTINUE"
820 IF INKEY$="" THEN GOTO 820
830 CLS
835 PRINT AT 0,13;"LOCK";TAB 13
"===="
840 PRINT AT 10,4;"██████████"
850 PRINT AT 18,4;"██████████"
860 FOR N=11 TO 17
870 PRINT AT N,4;"█▒▒▒▒▒▒▒▒█"
880 NEXT N
890 PRINT AT 12,6;"▒▒▒"
900 PRINT AT 14,6;"▒▒▒"
910 PRINT AT 16,6;"▒▒▒"
920 PRINT AT 14,18;"█████"
930 PRINT AT 15,18;"█▒▒▒█"
940 PRINT AT 16,18;"█████"
950 LET E=0
960 LET A=INT ,(RND*9)
970 LET B=INT (RND*9)
980 IF A=B THEN GOTO 970
990 LET C=A*10+B
1000 FOR N=0 TO 10
1010 LET D$=INKEY$
1020 IF D$="" THEN GOTO 1010
1030 LET D=VAL D$
1040 IF D=E THEN GOTO 1010
1050 PRINT AT 15,20;E
1060 PRINT AT 15,22;D
1070 IF E*10+D<(C+(6/SKILL)) AND
 E*10+D>(C-(6/SKILL)) THEN GOTO
1110
1080 LET E=D
1090 NEXT N
1100 GOTO 1850
1110 GOSUB 5000
1111 CLS
1113 PRINT "WELL DONE. YOU UNLOC
KED THE DOOR"
1114 GOSUB 5000
1115 CLS
1120 PRINT AT 0,9;"COURT YARD";T
AB 9;"=========="
1130 PRINT AT 2,0;" YOU MUST NOW
 REACH THE OTHER   SIDE OF THE C
OURT YARD WITHOUT  BEING SPOTTED
 BY A SEARCH LIGHT.";TAB 8;" ";T
AB 8;"YOUR CONTROLS ARE:-";TAB 8
;"5=LEFT";TAB 8;"8=RIGHT";TAB 8;
"6=DOWN";TAB 8;"7=UP"
1140 PRINT
1150 PRINT AT 17,7;"PRESS ANY KE
Y";TAB 7;"GOOD LUCK"
1160 TF INKEY$="" THEN GOTO 1160
1170 CLS
1180 FOR N=0 TO 21
1190 PRINT AT N,0;"██████████████
██████████████████"
1200 NEXT N
1210 LET G=21
1220 LET H=INT (RND*21)
1230 FOR N=0 TO SKILL
1240 LET F=INT (RND*21)
1250 LET D=INT (RND*31)
1260 PRINT AT F,D;"▒"
1270 NEXT N
1280 LET G1=G
1290 LET H1=H
1300 PRINT AT G1,H1;"█"
1310 IF INKEY$="5" THEN LET H=H-
1
1320 IF INKEY$="8" THEN LET H=H+
1
1330 IF INKEY$="6" THEN LET G=G+
1
1340 IF INKEY$="7" THEN LET G=G-
1
1350 LET I=PEEK 16396+256*PEEK 1
6397+1
1360 LET POS=PEEK (I+33*G+H)
1370 IF POS=CODE "▒" THEN GOTO 1
910
1380 PRINT AT G,H;"P"
1390 IF G=0 THEN GOTO 1410
1400 GOTO 1240
1410 GOSUB 5000
1411 CLS
1413 PRINT "WELL DONE. YOU CROSS
ED THE YARD"
1414 GOSUB 5000
1415 CLS
1420 PRINT AT 0,9;"DRIVE WAY";TA
B 9;"========="
1430 PRINT AT 2,1;"YOU MUST NOW
GET DOWN THE..... MINED DRIVE AN
D THEN YOU ARE    ALMOST FREE"
1440 PRINT " YOU ARE A ""P"" AND
 THE MINES ARE""M"""
1450 PRINT " YOUR CONTROLS ARE:-
";TAB 9;"""8""=RIGHT";TAB 9;"""5
""=LEFT"
1460 PRINT AT 17,4;"PRESS ANY KE
Y TO CONTINUE"
1470 IF INKEY$="" THEN GOTO 1470
1475 CLS
1480 LET C=CODE "▘ "
1490 LET A=CODE " "
1500 LET F=A
1510 LET B=CODE "+"
1520 LET N=CODE "▀"
1530 LET X=CODE "▒"
1540 LET Y=X
1550 FOR Q=0 TO (75*SKILL)
1560 LET Z=Y
1570 LET N=N+(SGN (CODE "▌"-INT
(RND*CODE "▀"))*(N<>A)*(N<>X)+(
N=A)-(N=X)
1580 SCROLL
1590 LET Y=Y-(INKEY$="5")+(INKEY
$="8")
1600 IF RND>.8 THEN PRINT AT B-C
,N+(INT (RND*CODE "▀")+C);"M";TA
B 31
1610 PRINT AT B,N-C;" M▒▒▒▒▒▒M ";A
T X,Y;"P";AT X-C,Z;"▒";AT X+C,Y;
1620 LET F=F+C
1630 LET W=PEEK (PEEK 16398+PEEK
 16399*256)
1640 IF W=CODE "█" OR W=CODE "M"
 THEN GOTO 1670
1650 NEXT Q
1660 GOTO 1720
1670 FOR A=0 TO 50
1680 PRINT AT 10,15;"BANG"
1681 PRINT AT 10,15;"BANG"
1690 NEXT A
1700 GOSUB 5000
1710 GOTO 1910
1720 GOTO 2070
1730 LET B=INT (RND*2)+1
1740 CLS
1750 IF A<>B THEN GOTO 380
1756 CLS
1760 IF A=B THEN PRINT "A GUARD
WAS WAITING FOR YOU.    YOU WERE
 THROWN BACK INTO YOUR  DARK CEL
L."
1770 PRINT AT 7,0;"PRESS NEWLINE
 TO TRY AGAIN"
1780 IF INKEY$="" THEN GOTO 1780
1785 PRINT AT 7,0;"PRESS NEWLINE
 TO TRY AGAIN"
1790 CLS
1800 GOTO 210
1810 CLS
1820 PRINT AT 1,1;"BAD LUCK YOU
TROD ON AN ALARM  PAD,YOU ARE NO
W BACK IN YOUR     CELL.PRESS ANY
 KEY TO TRY AGAIN"
1830 IF INKEY$="" THEN GOTO 1830
1840 GOTO 210
1850 CLS
1860 PRINT AT 0,9;"BAD LUCK";TAB
 9;"========"
1870 PRINT AT 2,1;"I FORGOT TO T
ELL YOU THAT...... YOU ONLY HAD
15 ATTEMPTS.BUT IF YOU PRESS ANY
 KEY THE GUARD   WILL TAKE YOU B
ACK TO YOUR CELL.    YOU CAN THE
N TRY AGAIN."
1880 IF INKEY$="" THEN GOTO 1880
1890 CLS
1900 GOTO 210
1910 CLS
1920 PRINT AT 0,9;"BAD LUCK";TAB
 9;"========"
1930 PRINT AT 2,0;" YOU WERE SEE
N BY A GUARD AND   HE TOOK YOU B
ACK TO YOUR CELL.";TAB 1;" ";TAB
 1;"PRESS ANY KEY TO TRY AGAIN"
1940 IF INKEY$="" THEN GOSUB 194
0
1950 GOTO 210
1960 CLS
1970 PRINT AT 5,10;"BAD LUCK";TA
B 2;"YOU MADE IT TO THE SAFE HOU
SE";TAB 12;"BUT...";TAB 4;"YOU R
AN OUT OF TIME."
1980 PRINT AT 16,4;"PRESS ANY KE
Y TO TRY AGAIN"
1990 IF INKEY$="" THEN GOTO 1990
2000 CLS
2010 GOTO 210
2020 CLS
2030 PRINT AT 4,0;"   BAD LUCK
YOU CRASHED .        AND,A GERMA
N PATROL CAUGHT YOU          ";TA
B 3;"PRESS ANY KEY TO RETURN....
..       TO YOUR CELL"
2040 IF INKEY$="" THEN GOTO 2040
2050 GOTO 210
2060 STOP
2070 GOSUB 5000
2072 CLS
2073 PRINT "WELL DONE. YOU GOT T
O THE GATES"
2074 GOSUB 5000
2076 CLS
2080 PRINT AT 0,9;"SAFE HOUSE";T
AB 9;"=========="
2090 PRINT AT 3,0;" YOU MUST NOW
 COLLECT YOUR        NECESSARY TRA
VEL PERMITS FROM   A SAFE HOUSE.
YOU ARE LOOKING     FOR """7""" ""*
"" ONE IS HIDDEN IN     EACH ROOM
."
2100 IF SKILL=1 THEN LET O=300
2110 IF SKILL=2 THEN LET O=250
2120 IF SKILL=3 THEN LET O=200
2130 PRINT " THE HOUSE IS UNDER
WATCH BUT   THE GUARD IS BEING C
HANGED SO   YOU   HAVE """;O;"""
 SECONDS."
2140 PRINT
2150 PRINT " USE THE CURSOR KEYS
 AND PICK   UP THE PERMITS BY RU
NNING OVER  THEM."
2160 PRINT AT 18,7;"PRESS ANY KE
Y"
2170 IF INKEY$="" THEN GOTO 2170
2180 CLS
2190 PRINT AT 1,1;"██████████████
███████████████"
2200 FOR N=2 TO 19
2210 PRINT AT N,1;"█
                   █"
2220 NEXT N
2230 PRINT AT 20,1;"███ ██████
██████████████"
2240 PRINT AT 19,5;"█ █ █   █"
```







```
      █        ███"
2250 PRINT AT 18,5;"█   ██   █
█ █   "
2260 PRINT AT 17,5;"██  █
 █ █     ██"
2270 PRINT AT 16,7;"█  █   █ █
 ███████   "
2280 PRINT AT 15,9;"█    █ █"
2290 PRINT AT 14,7;"█ █   █"
2300 PRINT AT 13,2;"████   █
 █    ████"
2310 PRINT AT 12,9;"█ ███"
2320 PRINT AT 11,2;"██ ██
    █ █   ███"
2330 PRINT AT 10,7;"█  ██     █
 ██    █"
2340 PRINT AT 9,7;"█          █
     █"
2350 PRINT AT 8,2;"█████  █ ███
███       █"
2360 PRINT AT 7,9;"█          █
██"
2370 PRINT AT 6,2;"███ ███  █  █
██ █      █"
2380 PRINT AT 5,8;"█  █  █ █
█ ██████"
2390 PRINT AT 4,8;"█  █  █ █
█"
2400 PRINT AT 3,8;"█  █  █ █ █
███████"
2410 PRINT AT 2,8;"█  █  █   █
█"
2420 PRINT AT 3,4;"*"
2430 PRINT AT 9,3;"*"
2440 PRINT AT 16,3;"*"
2450 PRINT AT 16,12;"*"
2460 PRINT AT 18,23;"*"
2470 PRINT AT 8,28;"*"
2480 PRINT AT 2,22;"*"
2490 LET G=20
2500 LET H=6
2510 LET T=0
2520 FOR N=0 TO 0
2530 LET G1=G
2540 LET H1=H
2550 LET G=G+(INKEY$="6")-(INKEY
$="7")
2560 LET H=H+(INKEY$="8")-(INKEY
$="5")
2570 PRINT AT G1,H1;" "
2580 LET I=PEEK 16396+256*PEEK 1
6397+1
2590 LET POS=PEEK (I+33*G+H)
2600 IF POS=CODE "*" THEN LET T=
T+1
2610 IF POS=CODE "█" THEN LET G=
G1
2620 IF POS=CODE "█" THEN LET H=
H1
2630 PRINT AT G,H;"█"
2640 IF G=20 AND H=6 AND T=7 THE
N GOTO 2670
2650 NEXT N
2660 GOTO 1960
2670 GOSUB 5000
2672 CLS
2673 PRINT "WELL DONE. YOU FOUND
 THE PERMITS"
2674 GOSUB 5000
2676 CLS
2680 PRINT AT 0,9;"HELICOPTER";T
AB 9;"=========="
2690 PRINT AT 2,0;" ON YOUR WAY
HOME BY HELICOPTER YOU SEE ";3*S
KILL;" BRITISH SEAMEN.        THE
Y ARE IN THE SEA AND THE      STE
RN OF THEIR TORPEDO LAUNCH    IS
GRADUALLY DISAPPEARING.          Y
OU MUST PICK THEM UP TO ....
 FINALLY GET HOME"
2700 PRINT
2710 PRINT
2720 PRINT "PRESS ANY KEY TO CON
TINUE"
2730 IF INKEY$="" THEN GOTO 2730
2740 CLS
2750 FOR N=1 TO (3*SKILL)
2760 LET L=10
2770 LET C=20
2780 LET A$=""
2790 LET D=INT (RND*4)+12
2800 CLS
2808 PRINT AT 0,10;"HELICOPTER";
TAB 10;"=========="
2810 PRINT AT 18,5;"-------------
----";AT L-1,C-1;"--+--";AT L,C;
"███*";AT L+1,C+1;A$
2820 IF A$="" THEN PRINT AT 18,D
;"0"
2830 IF INKEY$="7" AND L=17 AND
C=D-1 THEN LET A$="0"
2840 IF A$="0" AND L=9 THEN GOTO
 2920
2850 IF L=18 THEN GOTO 2900
2860 LET C=C+(INKEY$="8")-(INKEY
$="5")
2870 LET L=L+(INKEY$="6")-(INKEY
$="7")
2880 PRINT AT 0,0;A$
2890 GOTO 2800
2900 PRINT "CRASH"
2910 GOSUB 5000
2911 CLS
2912 PRINT "YOU CRASHED IN THE S
EA AND HAVE BEEN KILLED"
2913 GOTO 2960
2920 NEXT N
2930 GOTO 2940
2940 CLS
2945 FOR A=0 TO 10
2950 PRINT AT 10,4;"CONGRATULATI
ONS"
2951 PRINT AT 10,4;"CONGRATULATI
ONS"
2954 NEXT A
2960 PRINT AT 7,0;"IF YOU WANT T
O PLAY AGIN PRESS      ""Y"" IF NO
T PRESS ""N"""
2970 IF INKEY$="N" THEN STOP
2975 IF INKEY$="Y" THEN RUN
2976 GOTO 2970
2980 RUN
2990 STOP
5000 FOR A=0 TO 18
5010 NEXT A
5020 RETURN
9998 SAVE "COLDIT█"
9999 RUN
```

TOUCH LINE 32

Just because you get eight draws on the Pools does not necessarily mean you scoop the jackpot. If you do one of those complicated systems with lots of different lines to check you may only end up with a handful of fourth dividends for you pains.

Touch Line Plan 32 by L M Cook of Oldham in Lancashire will not predict a winning choice but it will take out the drudgery of checking all those lines. The plan works on Littlewoods, Vernon and Zetter Pools coupons and runs on any Spectrum.

You must enter your selections according to the points they scored — 3, 2, 1.5 etc — and the program will then run through the 72 combinations and tell you what dividends, if any, you have won. Although it will only work for the specific plan, it should be possible to adapt the program for use with other systems.

```
  20 BORDER 4: PAPER 4: INK 0
  30 PRINT AT 15,11; FLASH 1;"ST
OP TAPE"
  40 PAUSE 250
  50 DIM a$(18,72)
  60 LET fst=0: LET snd=0: LET t
hd=0: LET for=0: LET fif=0: LET
six=0
  70 LET pts=0
  80 DIM a(18)
  90 REM Touch line plan 32 DATA
 100 LET a$(1)="x  xx x xxxxx  x
x x xxxx            xxxxxxxx
     xxxxxxxx"
 101 LET a$(2)="xx  xx x xxxxx
xx x xxx            xxxxxxx x
               xxxxxxxx"
 102 LET a$(3)="xxx  xx x xxxxx
 xx x xx            xxxxxx xx
     xxxxxxx x"
 103 LET a$(4)="xxxx  xx x xxxxx
  xx x x            xxxxx xxx
               xxxxxxx x"
 104 LET a$(5)="xxxxx  xx x xxxx
x  xx x             xxxx xxxx
     xxxxxx xx"
 105 LET a$(6)=" xxxxx  xx x xxx
xx  xx x            xxx xxxxx
               xxxxxx xx"
```



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```
 106 LET a$(7)="x xxxxx  xx
      x  xx x xxxxxx xxxxxx
   xxxxx xxx"
 107 LET a$(8)=" x xxxxx  xx
      xx  xx x xxxx xxxxxxx
            xxxxx xxx"
 108 LET a$(9)="x x xxxxx  x
      xxx  xx x xx xxxxxxxx
   xxxx xxxx"
 109 LET a$(10)="xx x xxxxx
       xxxx  xx x x          xx
xxxxxx            xxxx xxxx"
 110 LET a$(11)=" xx x xxxxx
       xxxxx  xx x           xx
xxxxx xxxx xxxxx"
 111 LET a$(12)="  xx x xxxxx
        xxxxx  xx x          xx
xxxx xx           xxx xxxxx"
 112 LET a$(13)="              x x
xxxx  xx x xxxxx  xx         xx
xxx xxxxx xxxxxx"
 113 LET a$(14)="              x
xxxxx  xx x xxxxx  xx        xx
xx xxxx           xx xxxxxx"
 114 LET a$(15)="              x x
 xxxxx  xx x xxxxx  x        xx
x xxxxxx xxxxxxx"
 115 LET a$(16)="             xx
x xxxxx  xx x xxxxx          xx
 xxxxxx           x xxxxxxx"
 116 LET a$(17)="              xx
 x xxxxx  xx x xxxxx         x
xxxxxxx xxxxxxxx"
 117 LET a$(18)="               x
x x xxxxx  xx x xxxxx         x
xxxxxxx            xxxxxxxx"
 200 CLS
 210 PRINT "CHECK YOUR COUPON FI
RST."
 220 PRINT "Any column of 18 sel
ections      with a good chance s
hould be     noted as follows:
             List each result acc
ording to    the value of thepoin
ts, numbered1 to 18. FOR EXAMPLE
:"
 230 PRINT "1. 3
             2. 1.5
             3. 2
             4. 3       and so on."
 240 PRINT "So that the computer
 can         calculate the highes
t possible   points, first enter
the number   of score draws, no-s
core draws   and aways from the c
oupon."
 250 PRINT "When prompted, enter
 the points from your list."
 260 PRINT "ANY KEY TO CONTINUE.
"
 270 IF INKEY$="" THEN  GO TO 27
0
 280 CLS
 290 PRINT "Score draws ";
 300 INPUT "Score draws? ";scd:
PRINT scd
 310 PRINT "No-score draws ";
 320 INPUT "No-score draws? ";ns
d: PRINT nsd
 330 PRINT "Aways ";
 340 INPUT "Aways? ";aws: PRINT
aws
 360 IF scd>=8 THEN  LET pts=24:
 GO TO 430
 370 LET pts=scd*3
 380 IF scd+nsd>=8 THEN  LET x=8
-scd: LET y=x*2: LET pts=pts+y:
GO TO 430
 390 LET x=nsd*2: LET pts=pts+x
 400 IF scd+nsd+aws>=8 THEN  LET
 x=8-(scd+nsd): LET y=x*1.5: LET
 pts=pts+y: GO TO 430
 410 LET x=aws*1.5: LET pts=pts+
x
 420 LET x=8-(scd+nsd+aws): LET
pts=pts+x
 430 PRINT "MAX POINTS = ";pts
 440 DIM d(6)
 450 IF pts<24 THEN  GO TO 470
 460 LET d(1)=24: LET d(2)=23: L
ET d(3)=22.5: LET d(4)=22: LET d
(5)=21.5: LET d(6)=21: GO TO 530
 470 LET d(1)=pts
 480 LET d(2)=pts-.5
 490 LET d(3)=pts-1
 500 LET d(4)=pts-1.5
 510 LET d(5)=pts-2
 520 LET d(6)=pts-2.5
 530 PRINT "ANY KEY TO CONTINUE.
"
 540 IF INKEY$="" THEN  GO TO 54
0
 550 CLS
 560 PRINT "Enter points on winn
ing(?) line."
 570 LET x=1
 580 FOR n=2 TO 19: PRINT AT n,5
;x: LET x=x+1: NEXT n
 590 FOR n=1 TO 18
 600 INPUT "Selection points ";(
n);"  ";a(n)
 610 PRINT AT n+1,9;a(n)
 620 NEXT n: PAUSE 20
 630 PRINT "ARE THESE CORRECT? (
Y/N)"
 640 IF INKEY$="" THEN  GO TO 64
0
 650 IF INKEY$="n" THEN  GO TO 6
90
 670 IF INKEY$="y" THEN  CLS : G
O TO 730
 680 GO TO 640
 690 INPUT "Selectn. No. for Cor
tn. ";num
 700 INPUT "Correct pts. ";a(num
)
 710 PRINT AT num+1,9;"     ";AT n
um+1,9;a(num)
 720 GO TO 640
 730 CLS
 740 FOR x=1 TO 72
 750 LET points=0
 760 FOR n=1 TO 18
 770 IF a$(n)(x TO x)="x" THEN
LET points=points+a(n)
 775 NEXT n
 780 PRINT x;TAB 5;points;" pts"
: POKE 23692,255
 790 IF points>=d(6) THEN  GO SU
B 820
 800 NEXT x
 810 GO TO 890
 820 IF points=d(1) THEN  LET fs
t=fst+1
 830 IF points=d(2) THEN  LET sn
d=snd+1
 840 IF points=d(3) THEN  LET th
d=thd+1
 850 IF points=d(4) THEN  LET fo
r=for+1
 860 IF points=d(5) THEN  LET fi
f=fif+1
 870 IF points=d(6) THEN  LET si
x=six+1
 880 RETURN
 890 PAUSE 100
 900 CLS
 910 PRINT AT 0,11;"DIVIDENDS"
 920 PRINT AT 2,8;"First  ";d(1)
;"   ";fst
 930 PRINT AT 4,8;"Second ";d(2)
;"   ";snd
 940 PRINT AT 6,8;"Third  ";d(3)
;"   ";thd
 950 PRINT AT 8,8;"Fourth ";d(4)
;"   ";for
 960 PRINT AT 10,8;"Fifth  ";d(5
);"   ";fif
 970 PRINT AT 12,8;"Sixth  ";d(6
);"   ";six
 980 PRINT AT 14,0;"PRESS 'R'  T
O CHECK ANOTHER LINE"
 990 PRINT "        Press 'S' to S
top"
1000 IF INKEY$="" THEN  GO TO 10
00
1010 IF INKEY$="r" THEN  GO TO 1
040
1020 IF INKEY$="s" THEN  STOP
1030 GO TO 1000
1040 PRINT "ANY FURTHER  WINS WI
LL  BE ADDED"
1050 PRINT "       ANY KEY TO CON
TINUE": PAUSE 10
1060 IF INKEY$="" THEN  GO TO 10
60
1070 CLS : GO TO 70
```



more programs on page 97

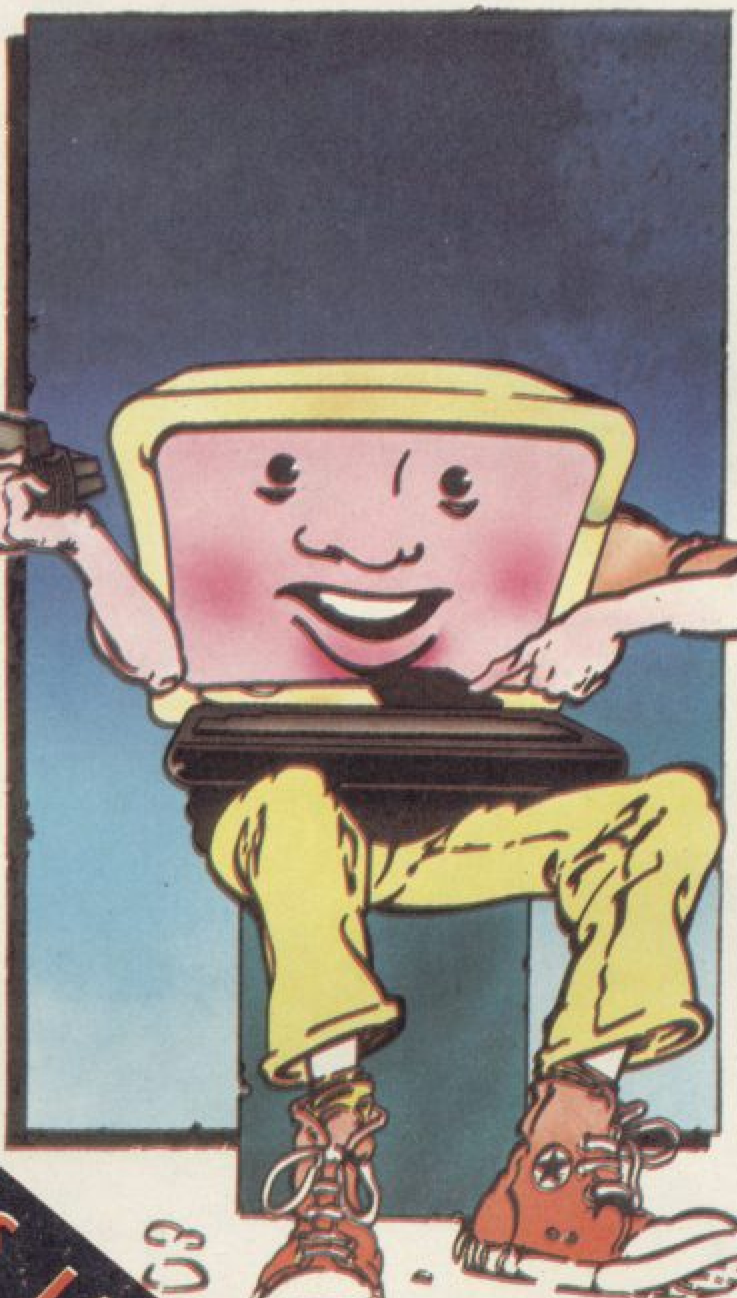
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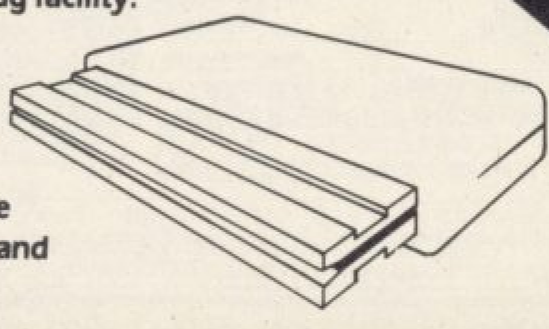


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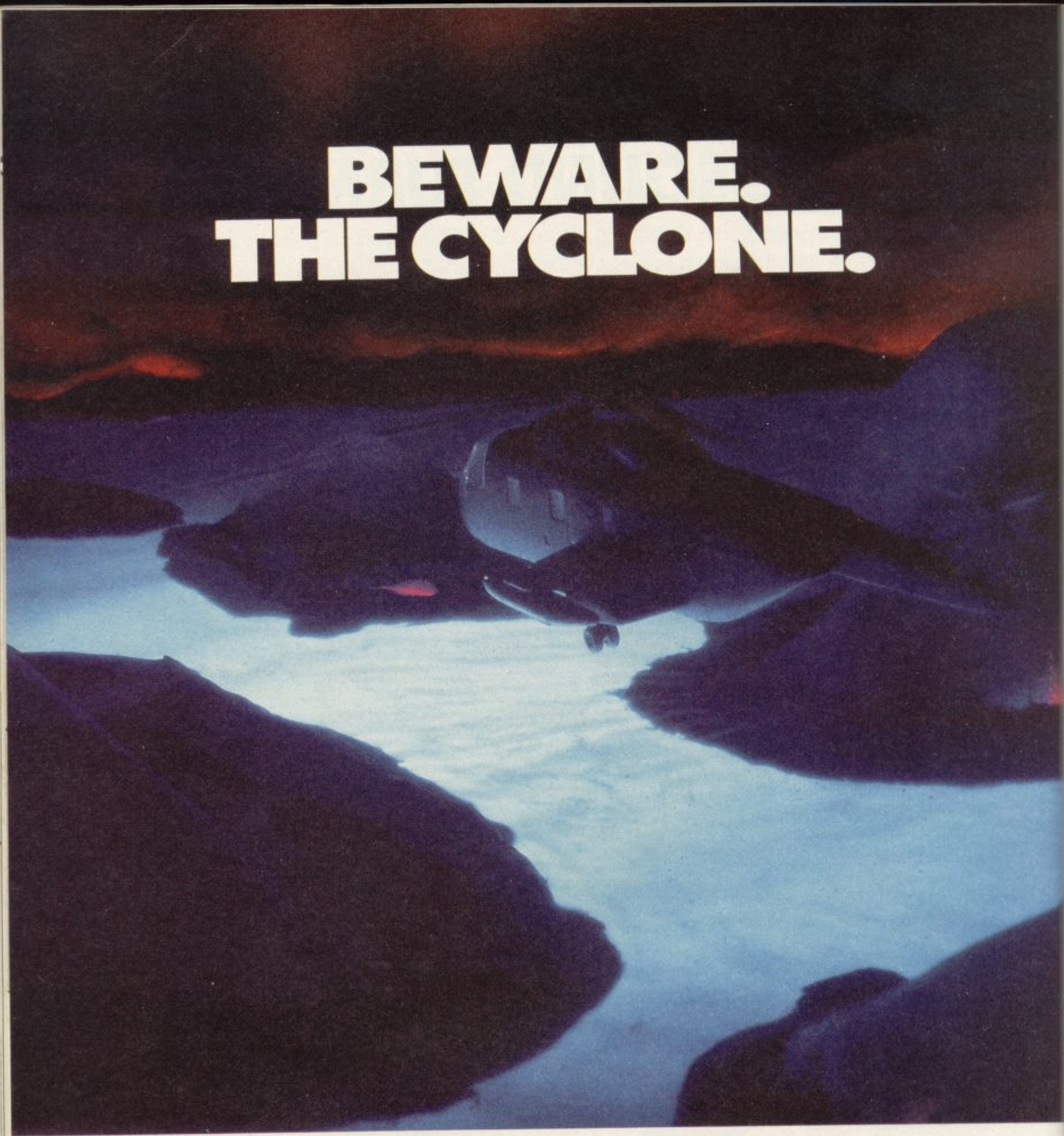
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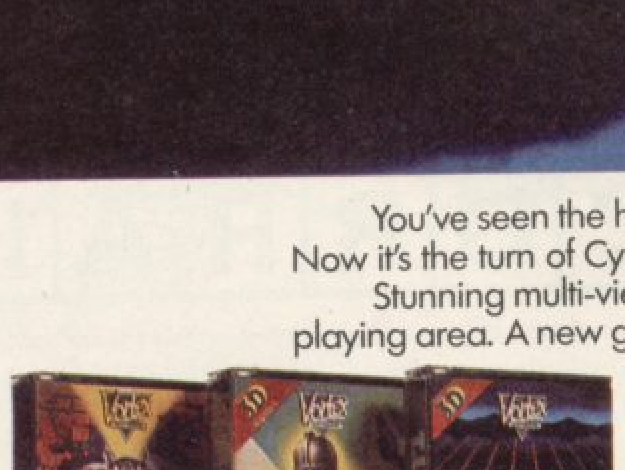
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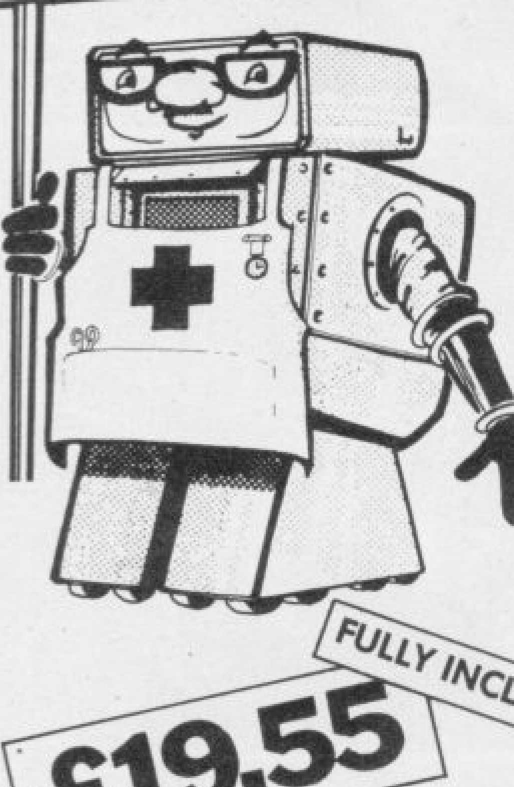
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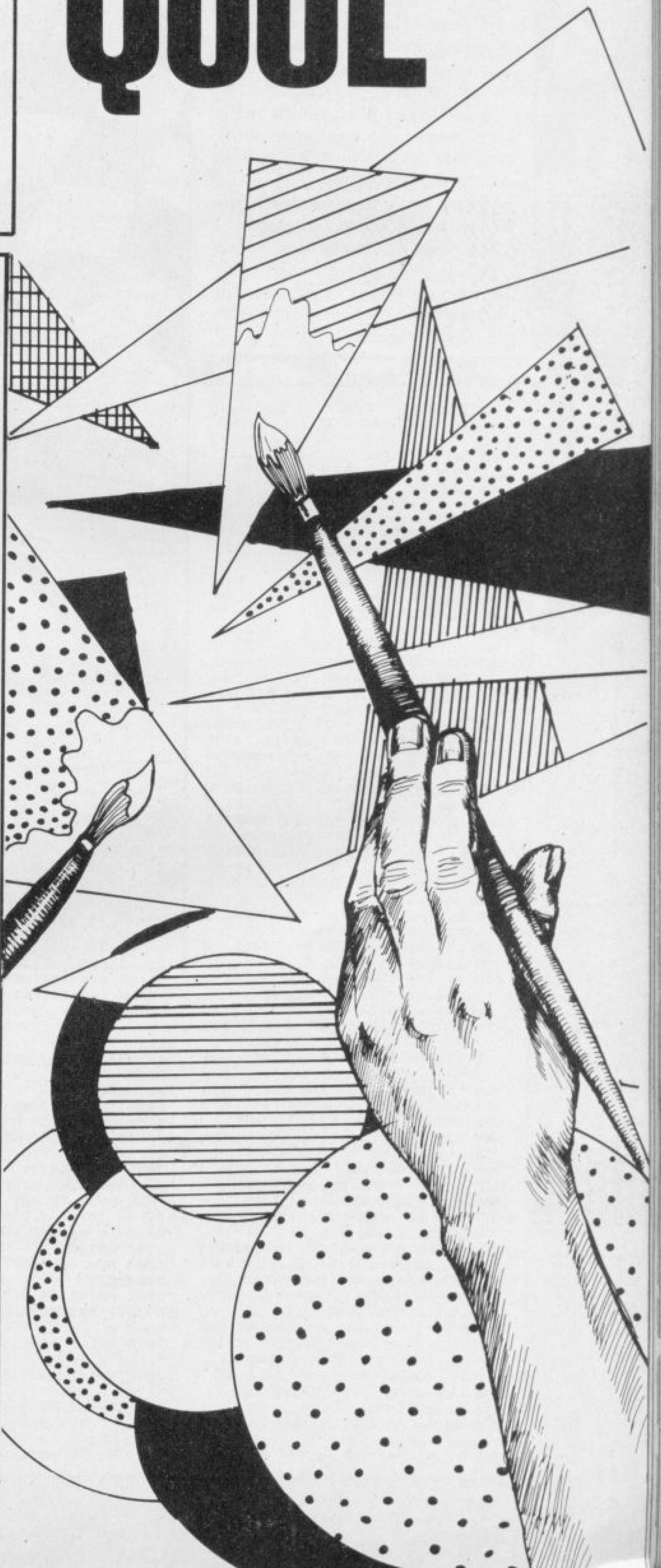
QooL

THE QL is capable of producing stunning graphics with quite simple procedures, but if you are not used to them you may find the commands a little confusing.

QooL Graphics by Neil Sampson of Oldham in Lancashire provides a series of routines to draw a variety of patterns, using BLOCK, FILL, CIRCLE and LINE commands to produce pleasing effects on the screeen.

Try running the program in both display modes in order to compare the different effects of stipple colouring in the program.

```
3 intro
4 DEFine PROCedure intro
5 WINDOW 1,512,256,0,0:SCALE 200,0,0:BORDER 4,2:PAPER
7:INK 0:CSIZE 3,1:CLS
6 PRINT"   F1-TRIANGLES"
7 PRINT"   F2-CIRCLES"
8 PRINT"   F3-LINES FROM CENTRE"
9 PRINT"   F4-LINES RANDOM"
10 PRINT"   F5-BLOCK EFFECT"
11 PRINT"   SHIFT+F1-MORE CIRCLES"
12 PRINT"     S-STOP"
13 choose
14 END DEFine intro
15 DEFine PROCedure choose
16 a=CODE(INKEY$(-1))
17 SELect a
18 =232:Triangles
19 =236:Circles
20 =240:lines_c
21 =244:lines
22 =248:beffect
23 =234:spc
24 =REMAINDER :choose
25 END SELect
26 END DEFine choose
27 DEFine PROCedure lines_c
28 CLS:FILL 0
29 REPeat loop
30 IF INKEY$="s":intro
31 INK RND(255):LINE 150,100 TO RND(300),RND(200)
32 END REPeat loop
33 END DEFine lines_c
34 DEFine PROCedure Circles
35 CLS
36 REPeat loop
37 IF INKEY$="s":intro
38 FILL 1:INK RND(255):CIRCLE RND(300),
RND(200),RND(30):FILL 0
39 END REPeat loop
40 END DEFine Circles
41 DEFine PROCedure lines
42 CLS:FILL 0
43 REPeat loop
44 IF INKEY$="s":intro
45 INK RND(255):LINE TO RND(300),RND(200)
46 END REPeat loop
47 END DEFine lines
48 DEFine PROCedure Triangles
49 CLS
50 REPeat loop
51 IF INKEY$="s":intro
52 a=RND(300):b=RND(200)
53 FILL 1:INK RND(255):LINE a,b TO RND(300),RND(200)TO
RND(300),RND(200) TO a,b:
FILL 0
54 END REPeat loop
55 END DEFine Triangles
56 DEFine PROCedure beffect
57 CLS
58 FOR r=240 TO 0 STEP -2:BLOCK r*2,r,0,0,r
59 PAUSE -1:intro
60 END DEFine beffect
61 DEFine PROCedure c2
62 SCALE 100,0,0:CLS:x=0
63 FOR r=0 TO 100
64 INK x MOD 7:x=x+1
65 IF INKEY$="s":intro
66 CIRCLE 80,50,r
67 END FOR r
68 PAUSE -1:intro
69 END DEFine c2
70 DEFine PROCedure spc
71 SCALE 1000,0,0:CLS
72 POINT 750,500
73 FOR f=0 TO 1000
74 PENUP:POINT 750,500:MOVE f:TURN f:PENDOWN
75 INK RND(255):FILL 1:CIRCLE_R,0,0,100:FILL 0
76 IF INKEY$="s":intro
77 END FOR f
78 PAUSE -1:intro
79 END DEFine spc
```





TEST DRIVE the last word in four-wheeled fury around ten different circuits in **Vroom** by Richard Judge and Stuart Harris of Scaldwell in Northamptonshire. Avoid the rocks and water hazards while picking up as many flags as you can.

Each screen is contained in its own routine, so you could write new ones easily. Vroom was written for the 48K Spectrum.

The program uses our special abbreviations for graphics characters, so please read the instructions on the first page of Program Printout before entering the listing. Characters in graphics mode are printed in a different, faint, typeface.

```
   1 BORDER 4: PAPER 4: CLS
   2 GO SUB 7000
   3 CLS
   4 GO SUB 6000
   6 REM *VARIABLES*
  10 LET x=15
  20 LET y=20
  30 LET m=18
  40 LET z=8
  45 LET screen=8000
  50 LET dam=0
  60 LET check=2000
  70 LET time=0
  80 LET bonus=0
  90 LET d=.01
  92 REM *DRAW SCREEN*
  96 GO SUB 7900: GO SUB screen
  98 REM *CONTROLS*
 100 IF INKEY$="o" THEN  LET z=z
-1: IF z=0 THEN  LET z=8
 110 IF INKEY$="p" THEN  LET z=z
+1: IF z=9 THEN  LET z=1
 120 IF z=1 THEN  GO SUB 4000: G
O TO 200
 130 IF z=2 THEN  GO SUB 4010: G
O TO 200
 140 IF z=3 THEN  GO SUB 4020: G
O TO 200
 150 IF z=4 THEN  GO SUB 4030: G
O TO 200
 160 IF z=5 THEN  GO SUB 4040: G
O TO 200
 170 IF z=6 THEN  GO SUB 4050: G
O TO 200
 180 IF z=7 THEN  GO SUB 4060: G
O TO 200
 190 IF z=8 THEN  GO SUB 4070: G
O TO 200
 200 REM *GEARS*
 202 IF INKEY$="1" THEN  LET m=1
8
 210 IF INKEY$="2" THEN  LET m=1
1
 220 IF INKEY$="3" THEN  LET m=5
 230 IF INKEY$="4" THEN  LET m=0
 235 IF m=0 THEN  GO TO 241
 240 FOR n=0 TO m: LET time=time
+.01: NEXT n
 250 BEEP .01,-20
 300 GO TO 100
1000 REM *SKID ROUTINE*
1002 LET z=INT (RND*7)+1
1010 BEEP .1,60
1020 PRINT AT y,x;"A": PAUSE 2:
BEEP .1,30: PRINT AT y,x;"C": PA
USE 2: BEEP .1,40: PRINT AT y,x;
"E": PAUSE 4: PRINT AT y,x;"G":
PAUSE 2: BEEP .1,50
1030 PRINT AT y,x;"B": PAUSE 2:
PRINT AT y,x;"D": PAUSE 2: PRINT
 AT y,x;"F": PAUSE 2: PRINT AT y
,x;"H": PAUSE 2
1040 LET m=30
1050 RETURN
2000 REM *CHECK ROUTINE*
2002 LET a$=SCREEN$ (y,x)
2010 IF a$="E" OR a$="X" OR a$="
I" OR a$="T" THEN  GO SUB 5100:
LET screen=screen+200: LET bonus
=bonus+1000: GO SUB 7900: GO SUB
 screen: GO SUB 5400
2020 IF ATTR (y,x)=33 THEN  LET
dam=dam+1: GO SUB 1000
2030 IF ATTR (y,x)=37 THEN  GO S
UB 1000
2050 IF ATTR (y,x)=34 THEN  LET
dam=dam+2: FOR n=5 TO -25 STEP -
3: BEEP .05,n: NEXT n: GO SUB 79
00
2055 IF ATTR (y,x)=35 THEN  LET
dam=dam-.2: LET bonus=bonus+100:
 FOR n=30 TO 40: BEEP .025,n: NE
XT n
2060 IF dam>10 THEN  GO TO 3000
2100 RETURN
3000 REM *END OF GAME*
3005 CLS
3007 PRINT AT 3,10; FLASH 1; BRI
GHT 1;"END OF GAME": FLASH 0: BR
IGHT 0
3010 PRINT AT 5,1;"TIME TAKEN =
";INT time
3020 PRINT AT 7,1;"BONUS SCORED
= ";bonus
3030 PRINT AT 9,1;"DAMAGE SUSTAI
NED = ";INT dam
3035 PRINT AT 11,1;"SKILL ATTAIN
ED = ";INT (bonus/time)
3040 PRINT AT 12,1;"'BELOW 100 P
OOR',(16*sp)ABOVE 150 GOOD'"
3045 PRINT AT 20,9;"PRESS ANY KE
Y"
3050 GO SUB 5300: PAUSE 0: PAUSE
 0: GO TO 0
3998 REM *BUGGY DIRECTION*
4000 LET x=x+1: LET y=y-1: GO SU
B check: PRINT AT y,x;"H": PRINT
 AT y+1,x-1;"(sp)": RETURN
4010 LET x=x+1: GO SUB check: PR
INT AT y,x;"C": PRINT AT y,x-1;"
(sp)": RETURN
4020 LET x=x+1: LET y=y+1: GO SU
B check: PRINT AT y,x;"G": PRINT
 AT y-1,x-1;"(sp)": RETURN
4030 LET y=y+1: GO SUB check: PR
INT AT y,x;"B": PRINT AT y-1,x;"
(sp)": RETURN
4040 LET x=x-1: LET y=y+1: GO SU
B check: PRINT AT y,x;"I": PRINT
 AT y-1,x+1;"(sp)": RETURN
4050 LET x=x-1: GO SUB check: PR
INT AT y,x;"D": PRINT AT y,x+1;"
(sp)": RETURN
4060 LET x=x-1: LET y=y-1: GO SU
B check: PRINT AT y,x;"F": PRINT
 AT y+1,x+1;"(sp)": RETURN
4070 LET y=y-1: GO SUB check: PR
INT AT y,x;"A": PRINT AT y+1,x;"
(sp)": RETURN
```



```
5000 REM *TUNES*
5005 DATA .2,2,.2,7,.2,2,.2,5,.2
,2,.2,4,.1,2,.2,0,.5,0
5010 DATA .2,2,.2,7,.2,2,.2,5,.2
,2,.2,4,.1,2,.2,0,.5,0
5015 DATA .2,2,.2,9,.2,5,.2,7,.2
,14,.2,7,.2,19
5016 DATA .2,2,.2,9,.2,5,.2,7,.2
,14,.2,7,.2,19
5020 RESTORE 10
5030 FOR n=1 TO 32
5040 READ d
5050 READ p
5060 BEEP d,p
5070 NEXT n
5080 RETURN
5100 DATA .15,9,.15,11,.15,9,.15
,7,.15,9,.15,14,.15,9,.15,19
5110 RESTORE 5100
5120 FOR n=1 TO 8
5130 READ d
5140 READ p
5150 BEEP d,p
5160 NEXT n
5170 RETURN
5300 DATA .2,14,.2,2,.2,7,.2,2,.
2,7,.2,14,.2,17,.2,14,1,19
5310 RESTORE 5300
5320 FOR n=1 TO 9
5330 READ d: READ p
5340 BEEP d,p
5350 NEXT n
5360 RETURN
5400 DATA 0.1,12,.1,9,.1,7,.1,12
,.1,9,.1,7,.5,19
5410 RESTORE 5400
5420 FOR n=1 TO 7
5430 READ d: READ p
5440 BEEP d,p
5450 NEXT n
5460 RETURN
6000 REM *TITLE*
6010 PRINT AT 4,13; FLASH 1; BRI
GHT 1; INK 0;"*BUGGY*";AT 5,12;
FLASH 1; BRIGHT 1; INK 0;"*BONKE
RS*"
6020 BRIGHT 1: FLASH 1: INK 0: P
RINT AT 3,14;"*****";AT 6,11;"**
*********": BRIGHT 0: FLASH 0
6025 PRINT AT 9,3;"CONTROLS";AT
9,3; OVER 1;"________"
6030 PRINT AT 11,3;"ROTATE BUGGY
 LEFT...KEY'O'";AT 13,3;"ROTATE
BUGGY RIGHT...KEY'P'"
6040 PRINT AT 15,3;"GEARS..'1','
2','3',AND'4',              ARE ON
 THERE RESPECTIVE          KEYS"
6050 PRINT AT 20,9; FLASH 1;"PRE
SS ANY KEY": PAUSE 0: CLS
6060 PRINT AT 2,3;"INSTRUCTIONS"
;AT 2,3; OVER 1;"____________"
6070 PRINT AT 4,3;"HITTING ROCKS
 'J' MEANS A           DAMAGE FACTOR
 OF 1 . HITTING        THE BARRIER '
N' MEANS A             DAMAGE FACTOR
 OF 2,PLUS             HAVING TO RES
TART THAT              STAGE . IF TH
E DAMAGE               FACTOR IS MOR
E THAN TEN             THEN THE RACE
 IS FINISHED .         IF WATER 'KL
' IS HIT,YOU           ARE SENT INTO
 A VIOLENT             SKID . IF YOU
 HIT A FLAG 'M'        THEN IT REDUC
ES YOUR DAMAGE         BY 0.2 ."
6080 PRINT AT 20,5; FLASH 1;"PRE
SS ANY KEY TO START": PAUSE 0
6085 GO SUB 5000
6090 RETURN
6100 REM *U.D.G.*
7000 DATA 0,90,90,24,24,90,126,9
0,90,126,90,24,24,90,90,0,0,230,
64,254,254,64,230,0,0,103,2,127,
127,2,103,0,0,126,64,124,64,64,1
26,0
7010 DATA 216,200,35,155,220,14,
52,48,12,44,112,59,217,196,19,27
,27,19,196,217,59,112,44,12,48,5
2,14,220,155,35,200,216,126,198,
151,217,91,110,100,60,6,110,127,
255,255,255,63,57
7020 DATA 4,78,223,254,254,231,1
98,0,224,120,76,103,127,64,64,64
,195,255,189,255,195
7025 RESTORE 7000
7030 FOR n=0 TO 104: READ a: POK
E USR "a"+n,a: NEXT n
7040 POKE USR "n"+0,BIN 11111111
7050 POKE USR "n"+1,BIN 01000010
7060 POKE USR "n"+2,BIN 00100100
7070 POKE USR "n"+3,BIN 11111111
7080 POKE USR "n"+4,BIN 11111111
7090 POKE USR "n"+5,BIN 00100100
7100 POKE USR "n"+6,BIN 01000010
7110 POKE USR "n"+7,BIN 11111111
7120 RETURN
7900 REM *SCREEN BORDER*
7905 CLS
7910 FOR n=0 TO 31: PRINT AT 21,
n; INK 2;"(ig3)": NEXT n
7920 FOR n=0 TO 31: PRINT AT 0,n
; INK 2;"(g3)": NEXT n
7930 FOR n=0 TO 21: PRINT AT n,0
; INK 2;"(ig5)": NEXT n
7940 FOR n=0 TO 21: PRINT AT n,3
1; INK 2;"(g5)": NEXT n
7950 PRINT AT 0,0; INK 2;"(ig4)"
7960 PRINT AT 21,31; INK 2;"(ig2)"
7970 PRINT AT 21,0; INK 2;"(ig1)"
7980 PRINT AT 0,31; INK 2;"(g7)"
7990 GO TO screen
7999
8000 REM *STAGE 1*
8003 FOR n=21 TO 15 STEP -1: PRI
NT AT n,12; INK 2;"N": NEXT n
8010 FOR n=21 TO 11 STEP -1: PRI
NT AT n,18; INK 2;"N": NEXT n
8020 FOR n=18 TO 5 STEP -1: PRIN
T AT 10,n; INK 2;"N": NEXT n
8030 FOR n=12 TO 0 STEP -1: PRIN
T AT 15,n; INK 2;"N": NEXT n
8040 FOR n=0 TO 23: PRINT AT 5,n
; INK 2;"N": NEXT n
8050 FOR n=5 TO 10: PRINT AT n,2
3; INK 2;"N": NEXT n
8060 FOR n=23 TO 31: PRINT AT 11
,n; INK 2;"N": NEXT n
8070 FOR n=19 TO 26: PRINT AT 16
,n; INK 2;"N": NEXT n
8080 FOR n=11 TO 21: PRINT AT n,
31; INK 2;"N": NEXT n
8085 FOR n=16 TO 21: PRINT AT n,
26; INK 2;"N": NEXT n
8090 PRINT AT 20,13;"(5*g6)"
8095 PRINT AT 20,27; INK 0;"EXIT
"
8100 PRINT AT 14,15; INK 5;"KL";
AT 8,19; INK 5;"KL";AT 8,4; INK
1;"J";AT 14,24; INK 1;"J"
8120 LET x=15: LET y=20
8130 LET z=8
8150 PRINT AT 13,3; INK 3;"M";AT
 13,21; INK 3;"M";AT 9,10; INK 3
;"M"
8160 PRINT AT 18,19;"STAGE 1"
8190 RETURN
8200 REM *STAGE 2*
8210 FOR n=31 TO 6 STEP -1: PRIN
T AT 7,n; INK 2;"N": NEXT n
8215 PRINT AT 1,27; INK 0;"(4*ig
6)"
8220 FOR n=26 TO 0 STEP -1: PRIN
T AT 2,n; INK 2;"N": NEXT n
8230 FOR n=0 TO 2: PRINT AT n,26
; INK 2;"N": NEXT n
8240 FOR n=6 TO 31: PRINT AT 16,
n; INK 2;"N": NEXT n
8250 FOR n=7 TO 16: PRINT AT n,6
; INK 2;"N": NEXT n
8260 PRINT AT 17,30;"E";AT 18,30
;"X";AT 19,30;"I";AT 20,30;"T"
8270 PRINT AT 5,20; INK 1;"J";AT
 4,15; INK 1;"J";AT 7,4; INK 1;"
J";AT 17,10; INK 1;"J";AT 19,15;
 INK 1;"J"
8280 PRINT AT 19,2; INK 5;"KL"
8290 PRINT AT 18,20; INK 5;"KL"
8300 LET y=1: LET x=28: LET z=4
8310 PRINT AT 5,16; INK 3;"M";AT
 17,17; INK 3;"M"(cc3)
8320 FOR n=7 TO 14: PRINT AT n,2
; INK 2;"N": NEXT n
8330 INK 0: PRINT AT 8,1;"S";AT
9,1;"T";AT 10,1;"A";AT 11,1;"G";
AT 13,1;"2": INK 2: PRINT AT 7,0
;"NN";AT 14,0;"NN"
8350 INK 0: RETURN
8400 REM *STAGE 3*
8403 FOR n=5 TO 31: PRINT AT 7,n
; INK 2;"N": NEXT n
8410 FOR n=0 TO 27: PRINT AT 16,
n; INK 2;"N": NEXT n
8415 FOR n=17 TO 20: PRINT AT n,
1; INK 0;"(ig6)": NEXT n
8420 FOR n=10 TO 16: PRINT AT n,
10; INK 2;"N": NEXT n
8430 FOR n=16 TO 15 STEP -1: PRI
NT AT n,5; INK 2;"N": NEXT n
8440 FOR n=7 TO 12: PRINT AT n,5
; INK 2;"N": NEXT n
8450 FOR n=8 TO 13: PRINT AT n,2
3; INK 2;"N": NEXT n
8460 FOR n=16 TO 10 STEP -1: PRI
NT AT n,18; INK 2;"N": NEXT n
8470 INK 0: PRINT AT 1,30;"E";AT
 2,30;"X";AT 3,30;"I";AT 4,30;"T
": INK 2: PRINT AT 5,30;"N";AT 6
,30;"N";AT 6,22;"N"
8475 FOR n=22 TO 29: PRINT AT 5,
n; INK 2;"N": NEXT n
8480 PRINT AT 19,4; INK 5;"KL";A
T 18,10; INK 1;"J";AT 18,23; INK
 1;"J"
8485 PRINT AT 6,23; INK 0;"STAGE
 3"
```

continued on page 100



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```
8490 LET x=1: LET y=19: LET z=2
8500 PRINT AT 17,20; INK 3;"M";A
T 14,8; INK 3;"M";AT 3,20; INK 3
;"M";AT 5,20; INK 3;"M": INK 0
8510 RETURN
8600 REM *STAGE 4*
8603 LET z=2: LET x=3: LET y=2
8615 FOR n=1 TO 4: PRINT AT n,1;
 INK 0;"(ig6)": NEXT n
8630 FOR n=0 TO 21: PRINT AT 5,n
; INK 2;"N": NEXT n
8640 FOR n=0 TO 7: PRINT AT 12,n
; INK 2;"N": NEXT n
8650 FOR n=8 TO 12: PRINT AT n,8
; INK 2;"N": NEXT n
8660 FOR n=8 TO 25: PRINT AT 17,
n; INK 2;"N": NEXT n
8670 FOR n=14 TO 21: PRINT AT n,
8; INK 2;"N": NEXT n
8680 FOR n=14 TO 16: PRINT AT n,
3; INK 2;"N": NEXT n
8690 FOR n=3 TO 7: PRINT AT 14,n
; INK 2;"N": NEXT n
8700 FOR n=17 TO 21: PRINT AT n,
25; INK 2;"N": NEXT n
8710 FOR n=13 TO 31: PRINT AT 12
,n; INK 2;"N": NEXT n
8720 FOR n=9 TO 12: PRINT AT n,1
2; INK 2;"N": NEXT n
8730 FOR n=12 TO 31: PRINT AT 9,
n; INK 2;"N": NEXT n
8740 FOR n=5 TO 9: PRINT AT n,25
; INK 2;"N": NEXT n
8750 PRINT AT 9,3; INK 5;"KL";AT
 2,19; INK 5;"KL";AT 3,27; INK 5
;"KL";AT 7,15; INK 5;"KL";AT 14,
13; INK 5;"KL";AT 15,26; INK 5;"
KL"
8760 INK 1: PRINT AT 20,30;"J";A
T 3,8;"J";AT 2,12;"J";AT 4,26;"J
";AT 7,5;"J";AT 14,18;"J";AT 17,
28;"J": INK 0
8770 INK 3: PRINT AT 4,28;"M";AT
 6,28;"M";AT 7,4;"M";AT 9,2;"M";
AT 11,2;"M";AT 11,4;"M";AT 9,6;"
M";AT 13,6;"M";AT 13,5;"M";AT 13
,4;"M";AT 13,3;"M";AT 13,2;"M";A
T 15,2;"M";AT 17,2;"M";AT 18,4;"
M";AT 16,6;"M": INK 0
8780 PRINT AT 20,26;"EXIT"
8785 PRINT AT 18,13; INK 0;"STAG
E 4";AT 20,12; INK 0;"BONUS RUN"
8798 RETURN
8800 REM *STAGE 5*
8804 LET z=4
8805 LET x=29: LET y=2
8810 FOR n=0 TO 14: PRINT  INK 2
;AT n,28;"N": NEXT n
8815 PRINT AT 1,29; INK 0;"(2*ig
6)"
8820 FOR n=6 TO 24: PRINT  INK 2
;AT 6,n;"N": NEXT n
8830 FOR n=6 TO 21: PRINT  INK 2
;AT n,24;"N": NEXT n
8840 FOR n=6 TO 24: PRINT  INK 2
;AT 15,n;"N": NEXT n
8850 FOR n=0 TO 10: PRINT  INK 2
;AT 12,n;"N": NEXT n
8860 FOR n=0 TO 19: PRINT  INK 2
;AT 19,n;"N": NEXT n
8870 FOR n=19 TO 21: PRINT  INK
2;AT n,19;"N": NEXT n
8880 PRINT AT 20,2;"HIGH SPEED T
RACK"
8890 INK 5: PRINT AT 4,18;"KL";A
T 18,20;"KL": INK 0
8900 INK 1: PRINT AT 3,6;"J";AT
10,4;"J";AT 8,16;"J";AT 15,3;"J"
: INK 0
8910 INK 3: PRINT AT 18,28;"M";A
T 11,25;"M";AT 13,11;"M";AT 14,7
;"M";AT 17,21;"M": INK 0
8920 PRINT AT 20,20;"EXIT"
8930 RETURN
9000 REM *STAGE 6*
9004 LET x=20: LET y=2: LET z=4
9005 FOR n=14 TO 31: PRINT  INK
2;AT 19,n;"N": NEXT n
9010 FOR n=0 TO 7: PRINT  INK 2;
AT n,18;"N": NEXT n
9015 PRINT AT 1,19;"(4*ig6)"
9020 FOR n=18 TO 25: PRINT  INK
```

continued on page 105

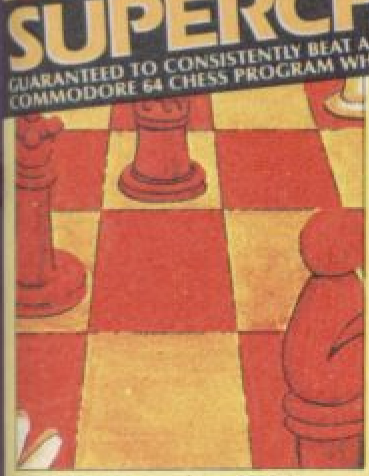
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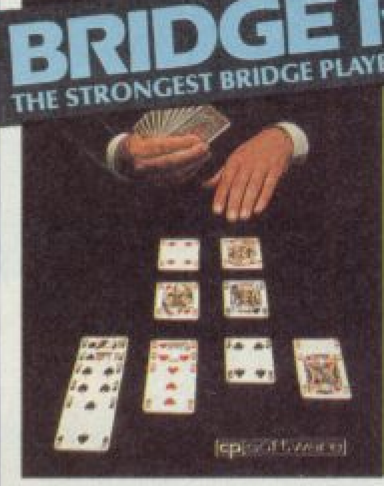
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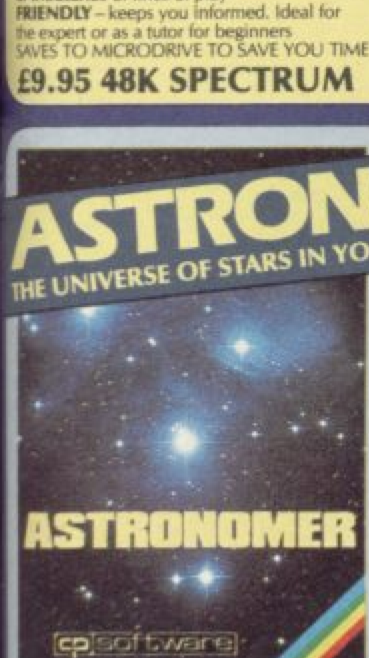
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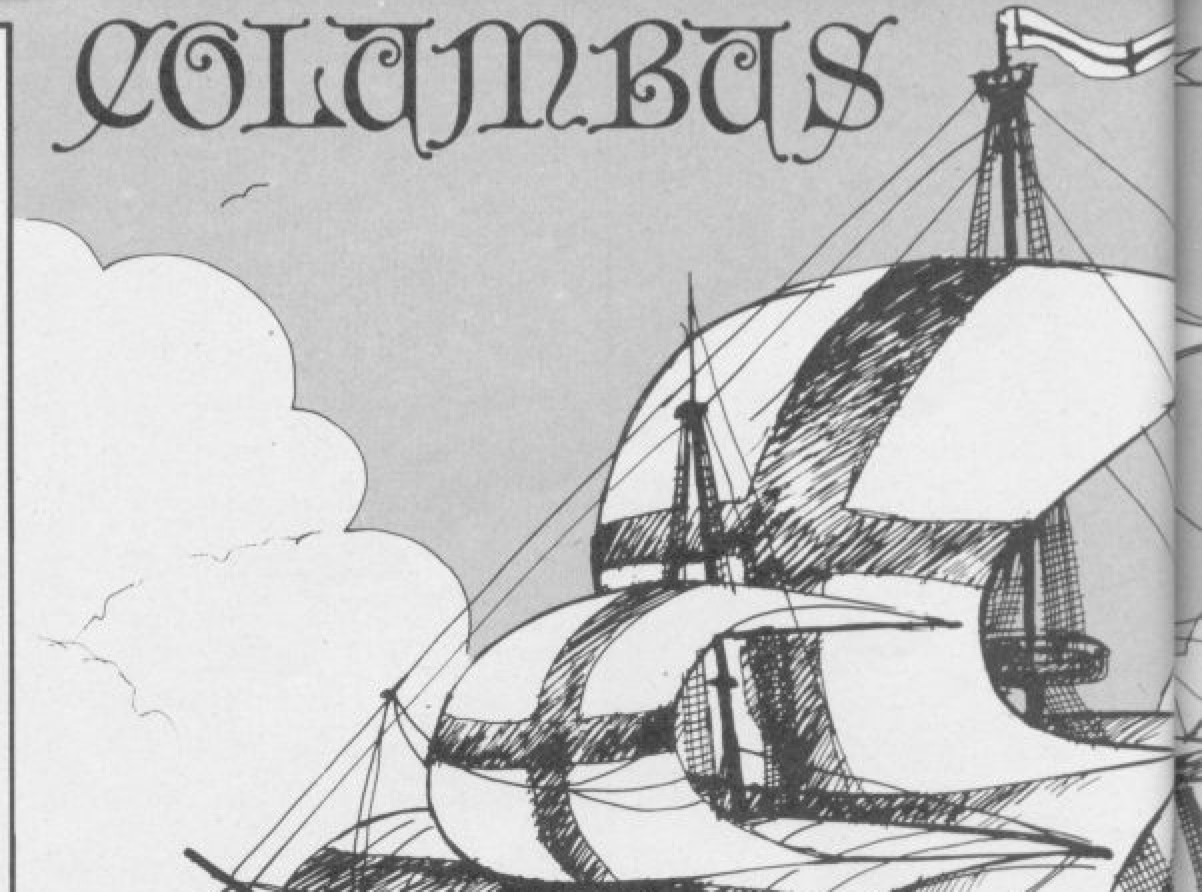
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continued from page 100

```
2;AT 7,n;"N": NEXT n
9030 FOR n=7 TO 9: PRINT  INK 2;
AT n,25;"N": NEXT n
9040 FOR n=0 TO 2: PRINT  INK 2;
AT n,25;"N": NEXT n
9050 FOR n=23 TO 31: PRINT  INK
2;AT 2,n;"N": NEXT n
9060 FOR n=4 TO 17: PRINT  INK 2
;AT n,3;"N": NEXT n
9070 FOR n=3 TO 13: PRINT  INK 2
;AT 4,n;"N": NEXT n
9080 FOR n=4 TO 12: PRINT  INK 2
;AT n,13;"N": NEXT n
9090 FOR n=13 TO 31: PRINT  INK
2;AT 12,n;"N": NEXT n
9100 FOR n=9 TO 21: PRINT  INK 2
;AT n,8;"N": NEXT n
9110 FOR n=8 TO 25: PRINT  INK 2
;AT 15,n;"N": NEXT n
9120 FOR n=19 TO 21: PRINT  INK
2;AT n,13;"N": NEXT n
9130 FOR n=0 TO 2: PRINT  INK 2;
AT n,8;"N": NEXT n
9135 FOR n=0 TO 2: PRINT  INK 2;
AT n,23;"N": NEXT n
9140 INK 5: PRINT AT 2,5;"KL";AT
 5,25;"KL";AT 17,12;"KL": INK 0
9150 INK 1: PRINT AT 10,16;"J";A
T 6,2;"J";AT 11,1;"J";AT 19,5;"J
";AT 11,6;"J";AT 12,10;"J": INK
0
9160 INK 3: PRINT AT 9,28;"M";AT
 9,15;"M";AT 4,16;"M";AT 2,14;"M
";AT 16,6;"M";AT 16,28;"M";AT 16
,29;"M": INK 0
9170 PRINT AT 20,15;"LOW SPEED T
RACK"
9180 PRINT AT 20,9;"EXIT"
9190 RETURN
9200 REM *STAGE 7*
9205 INK 2: LET x=10: LET y=1: L
ET z=4
9210 FOR n=0 TO 8: PRINT  INK 2;
AT 2,n;"N": NEXT n
9215 PRINT AT 1,9; INK 0;"(4*ig6
)"
9220 FOR n=0 TO 2: PRINT  INK 2;
AT n,8;"N": NEXT n
9230 FOR n=0 TO 10: PRINT  INK 2
;AT 9,n;"N": NEXT n
9240 FOR n=0 TO 18: PRINT  INK 2
;AT n,13;"N": NEXT n
9250 FOR n=4 TO 13: PRINT  INK 2
;AT 5,n;"N": NEXT n
9260 FOR n=3 TO 13: PRINT AT 13,
n;"N"(cci4): NEXT n
9270 FOR n=0 TO 9: PRINT AT 18,n
;"N": NEXT n
9280 FOR n=18 TO 21: PRINT AT n,
9;"N": NEXT n
9290 FOR n=4 TO 21: PRINT AT n,1
7;"N": NEXT n
9300 FOR n=0 TO 17: PRINT AT n,2
1;"N": NEXT n
9310 FOR n=4 TO 21: PRINT AT n,2
5;"N": NEXT n
9320 FOR n=0 TO 7: PRINT AT n,29
;"N": NEXT n
9330 FOR n=29 TO 31: PRINT AT 7,
n;"N": NEXT n
9340 FOR n=12 TO 21: PRINT AT n,
29;"N": NEXT n
9350 FOR n=29 TO 31: PRINT AT 12
,n;"N": NEXT n
9360 INK 5: PRINT AT 19,20;"KL";
AT 16,3;"KL"
9370 INK 1: PRINT AT 20,11;"J";A
T 11,11;"J";AT 2,17;"J";AT 2,25;
"J": INK 0
9380 INK 3: PRINT AT 6,1;"M";AT
10,15;"M";AT 10,19;"M";AT 10,24;
"M"; INK 0
9390 INK 0: PRINT AT 1,1;"TRACK
7";AT 19,3;"GEAR";AT 20,3;"1--2"
;AT 8,30;"E";AT 9,30;"X";AT 10,3
0;"I";AT 11,30;"T"
9399 RETURN
9400 LET x=1: LET y=10: LET z=2
9410 INK 2: FOR n=0 TO 2: PRINT
AT 12,n;"N": NEXT n
9420 FOR n=12 TO 21: PRINT AT n,
2;"N": NEXT n
9430 FOR n=0 TO 6: PRINT AT 7,n;
"N": NEXT n
9440 FOR n=0 TO 7: PRINT AT n,6;
"N": NEXT n
9450 FOR n=8 TO 25: PRINT AT 2,n
;"N": NEXT n
9460 FOR n=8 TO 25: PRINT AT 7,n
;"N": NEXT n
9470 FOR n=2 TO 7: PRINT AT n,8;
"N": NEXT n
9480 FOR n=2 TO 7: PRINT AT n,25
;"N": NEXT n
9485 FOR n=0 TO 7: PRINT AT n,27
;"N": NEXT n
9490 FOR n=27 TO 31: PRINT AT 7,
n;"N": NEXT n
9495 FOR n=12 TO 20: PRINT AT n,
27;"N": NEXT n
9510 FOR n=27 TO 31: PRINT AT 12
,n;"N": NEXT n: INK 0
9520 INK 5: FOR n=8 TO 20: PRINT
 AT n,16;"KL": NEXT n
9530 INK 1: FOR n=8 TO 20 STEP 2
: PRINT AT n,14;"J";AT n,19;"J":
 NEXT n
9540 INK 3: FOR n=9 TO 20 STEP 2
: PRINT AT n,14;"M";AT n,19;"M":
 NEXT n: INK 0
9560 INK 0: PRINT AT 4,13;"CAUTI
ON";AT 2,1;"STAGE";AT 4,3;"8";AT
 8,30;"E";AT 9,30;"X";AT 10,30;"
I";AT 11,30;"T": FOR n=8 TO 11:
PRINT AT n,1;"(ig6)": NEXT n
9570 RETURN
9598 REM *** screen 9 ***
9600 LET x=1: LET y=10: LET z=2
9610 INK 2: FOR n=0 TO 7: PRINT
AT n,15;"N";AT n,26;"N": NEXT n
9620 FOR n=12 TO 15: PRINT AT 7,
n;"N";AT 12,n;"N": NEXT n
9630 FOR n=7 TO 12: PRINT AT n,1
2;"N": NEXT n
9640 FOR n=12 TO 18: PRINT AT n,
15;"N": NEXT n
9650 FOR n=15 TO 28: PRINT AT 18
,n;"N": NEXT n
9660 FOR n=18 TO 31: PRINT AT 15
,n;"N": NEXT n
9670 FOR n=3 TO 15: PRINT AT n,1
8;"N": NEXT n
9680 FOR n=23 TO 31: PRINT AT 13
,n;"N": NEXT n
9690 FOR n=3 TO 13: PRINT AT n,2
3;"N": NEXT n
9695 FOR n=18 TO 22: PRINT AT 3,
n;"N": NEXT n
9700 FOR n=26 TO 31: PRINT AT 8,
n;"N": NEXT n
9705 FOR n=0 TO 2: PRINT AT 12,n
;"N": NEXT n
9710 FOR n=12 TO 21: PRINT AT n,
2;"N": NEXT n
9715 FOR n=0 TO 6: PRINT AT 7,n;
"N": NEXT n
9720 FOR n=3 TO 12: PRINT AT 4,n
;"N": NEXT n
9725 FOR n=4 TO 15: PRINT AT n,9
;"N": NEXT n
9730 FOR n=7 TO 18: PRINT AT n,6
;"N": NEXT n
9735 FOR n=6 TO 9: PRINT AT 18,n
;"N": NEXT n
9740 FOR n=9 TO 12: PRINT AT 15,
n;"N": NEXT n
9745 FOR n=15 TO 21: PRINT AT n,
12;"N": NEXT n: INK 0
9750 FOR n=8 TO 11: PRINT AT n,1
;"(ig6)": NEXT n
9755 PRINT AT 13,1;"S";AT 14,1;"
T";AT 15,1;"A";AT 16,1;"G";AT 17
,1;"E";AT 19,1;"9"
9760 PRINT AT 5,19;"DEAD";AT 7,1
9;"SLOW"
9765 PRINT AT 11,19;"GEAR";AT 13
,19;"1..2"
9770 INK 5: PRINT AT 9,16;"KL";A
T 16,22;"KL";AT 6,3;"KL": INK 0
9775 INK 1: PRINT AT 2,6;"J";AT
2,9;"J";AT 2,12;"J";AT 13,4;"J";
AT 10,7;"J";AT 17,13;"J";AT 15,1
4;"J";AT 19,10;"J";AT 11,17;"J";
AT 19,22;"J";AT 20,25;"J";AT 9,2
5;"J";AT 1,24;"J": INK 0
9780 INK 3: PRINT AT 2,5;"M";AT
2,8;"M";AT 2,11;"M";AT 19,27;"M"
;AT 9,11;"M";AT 16,4;"M": INK 0
9785 PRINT AT 9,30;"E";AT 10,30;
"X";AT 11,30;"I";AT 12,30;"T"
9790 RETURN
9798 REM *** screen 10 ***
9800 LET x=1: LET y=11: LET z=2
9810 INK 2: FOR n=0 TO 19: PRINT
 AT n,10;"N": NEXT n
9820 FOR n=0 TO 8: PRINT AT n,26
;"N": NEXT n
9830 FOR n=27 TO 31: PRINT AT 8,
n;"N": NEXT n
9840 FOR n=0 TO 10: PRINT AT 8,n
;"N": NEXT n
9850 FOR n=0 TO 3: PRINT AT 13,n
;"N": NEXT n
9860 FOR n=13 TO 21: PRINT AT n,
3;"N": NEXT n
9870 INK 1: FOR n=11 TO 26: PRIN
T AT 9,n;"J";AT 10,n;"J";AT 15,n
;"J";AT 16,n;"J": NEXT n
9880 FOR n=11 TO 14: PRINT AT n,
11;"J";AT n,12;"J";AT n,25;"J";A
T n,26;"J": NEXT n
9890 INK 3: FOR n=14 TO 23: PRIN
T AT 11,n;"M";AT 12,n;"M";AT 13,
n;"M";AT 14,n;"M": NEXT n
9900 INK 0: FOR n=11 TO 25: PRIN
T AT 1,n;"(g6)";AT 2,n;"(g6)";AT
 3,n;"(g6)": NEXT n
9910 PRINT AT 1,15;"FINISH";AT 2
,2;"STAGE";AT 4,3;"10";AT 6,2;"G
EAR..2"
9915 PRINT AT 2,16; INK 0; BRIGH
T 0;"EXIT"
9920 RETURN
9999 GO TO 3000
```

COLUMBUS



Take ship for the New World and found an empire in a thrilling simulation of the struggles of European nations to compete for a share of America's riches in the 15th Century.

Columbus, by Nicholas Holgate, was a runner up in the 1984 Cambridge Awards competition. The game is for two to five players, but should prove entertaining for one.

Enter listing 1 first, and SAVE it with SAVE "col" LINE 10. Then Enter listing 2 and SAVE with SAVE "Columbus" LINE 3. Then the first listing will automatically RUN and LOAD the second. The program runs on the 48K Spectrum.

Each turn begins with a financial statement, following which you may choose a number of options.

Ships allows you to explore, build ships and improve their design. It also allows you to engage in piracy, invade an opponent, or seek to blockade his ports if at war. A further option is to protect trade or move troops in convoy.

Soldiers gives four options. You may explore, attack or defend in the New World. You may also recruit new troops.

Spies allows you to examine certain details of your rivals' progress and plans.

Crop changes allows you to instruct your colonists on what products they should aim to send home. What you decide will depend on the type of land colonised.

Tax changes may be used to increase revenue, but high taxes can deter colonists.

War allows you to plot an attack on a player the following turn. A declaration of war will only be announced on that turn.

The different types of land are colour coded. White indicates tundra or desert, of territorial significance only. Yellow is plains, the best for growing crops. Green is forest producing timber thus cutting shipbuilding costs. Purple may produce silver or gold.

Some land is inhabited, and you will have to deal with the natives there. You can trade with them or oppress them.

At the end of each round, all players may see a report on the outcome of trading and wars, along with an indication of who is winning. The game ends when one player has achieved colonial domination, but that player may not be the overall winner.

Columbus uses our special abbreviations for graphics characters, so please read the instructions on the first page of Program Printout.

Listing 1

```
   3 PRINT AT 9,5; FLASH 1;"Plea
se stop the tape.": BEEP .5,.5:
PAUSE 200: CLS
   5 GO TO 90
  25 BEEP .5,.5: PRINT AT 21,19;
"Try again!": RETURN
  90 LET f=0: CLS : PRINT AT 10,
11; INK 1; INVERSE 1;"COLUMBUS":
 GO SUB 9000
 100 INPUT "How many players ? (
2-5) ";x$
 103 IF CODE x$<50 OR CODE x$>53
 THEN  BEEP .5,.5: GO TO 100
 104 LET p=VAL x$: POKE 65471,p
 125 LET n$="SPAIN   PORTUGALHOL
LAND FRANCE  ENGLAND ": DEF FN g
$(n$,x)=n$(8*x-7 TO x*8)
 126 FOR x=1 TO p
 128 IF CODE n$(x*8-7)=32 THEN
PRINT AT 10+x,6; INK x;n$(8*x-6
TO 8*x);" is playing": GO TO 13
0
 129 PRINT AT 10+x,6; INK x;FN g
$(n$,x);" is playing."
 130 NEXT x
 131 PAUSE 200
 135 CLS : PRINT AT 10,2; FLASH
1;"Start tape running please."
 140 LOAD "Columbus"
 150 STOP
9000>DATA 119,170,221,255,119
,170,221,255
9001 DATA 0,16,120,60,120,147,25
4,0
9002 DATA 25,26,60,60,56,88,24,2
4
9003 DATA 28,20,28,42,42,42,42,1
07
9004 DATA 0,8,30,60,30,201,127,0
9005 DATA 0,16,16,126,255,86,118
,118
9006 DATA 16,16,56,56,124,108,23
8,238
9007 DATA 24,126,122,223,126,24,
24,24
9008 DATA 152,88,60,60,28,26,24,
24
9010 DATA 255,129,129,129,129,12
9,129,255
9012 DATA 102,102,126,126,126,12
6,126,126
9015 DATA 24,24,60,60,60,24,24,2
4
9020 LET n=12: FOR x=1 TO n*8
9022 READ p
9024 POKE 65367+x,p
9025 NEXT x
9030 RETURN
```

Listing 2

```
   3 LET p=PEEK 65471: LET x$=ST
R$ p
   4 IF p=0 THEN  INPUT "How man
y players ? (2-5)";x$: IF CODE x
$<50 OR CODE x$>53 THEN  BEEP .5
,.5: GO TO 4
   5 LET p=VAL x$: GO TO 90
   7 LET m=m+1: RETURN
  10 INPUT "Press ENTER to conti
nue.";x$: RETURN
  15 INK 0: PAPER 7: RETURN
  20 LET m=m+1: LET x$=STR$ x: I
F x<0 THEN  INK 2
  21 IF m>21 THEN  LET m=21
  22 PRINT AT m,30-LEN x$; PAPER
 7;"(sp)": PRINT AT m,31-LEN x$;
```



```
x: INK 0
  23 IF LEN x$=1 THEN  PRINT AT
m,28; FLASH 0; PAPER 7;"(sp)"
  24 RETURN
  25 BEEP .5,.5: PRINT AT 21,19;
"Try again!": RETURN
  28 LET a=8
  29 LET b=21
  30 FOR x=a TO b: PRINT AT x,18
;"(14*sp)": NEXT x: RETURN
  35 INPUT "Choice (number) ? ";
x$
  40 IF CODE x$<48 OR CODE x$>48
+n THEN  BEEP .5,.5: GO TO 35
  45 RETURN
  50 LET c=INT ((a(b,a)/10-INT (
a(b,a)/10))*10+.5): RETURN
  55 LET b(q,z)=INT (b(q,z)/2):
RETURN
  60 LET k=1+INT (RND*(p-.5)): R
ETURN
  65 LET c=INT (a(b,a)/10+.2): R
ETURN
  75 LET a=a-m: LET b=b-n: RETUR
N
  90 LET f=1: GO SUB 7280: GO SU
B 8000
 105 LET co=0: LET ff=0: LET f=0
 110 LET nb=0: LET cr=7: LET int
=.1: LET m1=250: LET m2=10: LET
t=1488: LET h=100: DIM c$(p,300-
p*20): DIM b(p,80)
 112 LET i$="SPHFE": LET m$="Spa
nish(3*sp)PortugueseDutch(5*sp)F
rench(4*sp)English(3*sp)"
 115 LET s$="(sp)submit(2*sp)to(
2*sp)ally(2*sp)with(2*sp)trade w
ith(2*sp)mistrust(4*sp)attack(5*
sp)": LET h$="explore invade(2*s
p)blockadepiracy(2*sp)convoy(2*s
p)patrol(2*sp)build(3*sp)design(
2*sp)nothing(sp)"
 120 LET p$="": FOR k=1 TO p: LE
T p$=p$+CHR$ (k+48): NEXT k: LET
 p$=p$(p)+p$( TO p-1)
 125 LET n$="(sp)SPAIN(2*sp)PORT
UGALHOLLAND(2*sp)FRANCE ENGLAND(
sp)": DEF FN g$(n$,q)=n$(8*q-7 T
O 8*q)
 127 DIM q(12,5): FOR k=1 TO 12:
 LET q(k,1)=INT (h*RND)+3: LET q
(k,2)=1+RND/5: LET q(k,3)=.1+RND
+RND: LET q(k,4)=INT (RND*h)+1:
NEXT k
 128 LET q(8,4)=INT (250-h*RND):
 LET q(9,4)=INT (175-h*RND)
 130 DIM e$(21,4): FOR k=1 TO 21
: LET e$(k)=CHR$ (k+64)+CHR$ (97
+25*RND)+CHR$ (97+25*RND)+CHR$ (
97+25*RND): NEXT k
 135 LET f$="Corn(4*sp)Fish(4*sp
)Furs(4*sp)Hides(3*sp)Timber(2*s
p)Sugar(3*sp)Tobacco Gold(4*sp)S
ilver(2*sp)Cotton(2*sp)Coffee(2*
sp)"
 140 FOR k=1 TO p: LET b(k,6)=IN
T (RND*2000+10500): LET b(k,12)=
3+INT (4*RND): LET b(k,21)=INT (
h+RND*h): LET b(k,24)=INT (20+RN
D*20)/h: LET b(k,25)=1
 145 LET b(k,29)=300+INT (200*RN
D): LET b(k,32)=INT (h+RND*h): L
ET b(k,56)=50: LET b(k,57)=50: N
EXT k
 200 LET kkk=0: LET t=t+4: FOR k
=1 TO p: LET b(k,9)=b(k,5): NEXT
 k
 205 LET p$=p$(2 TO p)+p$(1)
 210 LET kkk=kkk+1
 215 IF kkk=p+1 THEN  GO TO 7000
 220 LET q=VAL p$(kkk)
 222 IF CODE c$(q,1)<>32 THEN  L
ET b(q,20)=b(q,20)+b(q,21)
 225 LET b(q,74)=1: LET b(q,75)=
0: LET b(q,76)=0:: LET w=INT (h+
RND*h+5*(t-1496)+b(q,8)*4): LET
b(q,21)=INT (w-b(q,24)*w):: FOR
y=1 TO 3: LET b(q,28+5*y)=3: LET
 b(q,27+5*y)=b(q,27+5*y)+b(q,29+
5*y): NEXT y
 230 LET ch=0: IF b(q,73)>10 THE
N  LET b(q,25)=b(q,25)+.1
 235 IF b(q,73)>h THEN  LET b(q,
25)=b(q,25)+.1
 250 PAPER q: INK 7: FLASH 1: CL
S : FLASH 0: PRINT AT 8,12;FN g$
(n$,q);AT 12,8;"The year is ";t:
 GO SUB 10
 255 GO SUB 15
 300 CLS : BORDER q: IF q<>3 THE
N  PRINT AT 3,9;"Your Majesty !"
 305 IF q=3 THEN  PRINT AT 3,8;"
Fellow burghers !"
 310 PRINT AT 6,2;"The Treasurer
 begs leave to";AT 7,12;"report.
": GO SUB 10
 312 IF b(q,6)<(-4000-(2000*RND)
) THEN  GO SUB 6800
 315 CLS : PRINT AT 1,12; INK q;
 FLASH 1;FN g$(n$,q)
 320 LET m=3: PRINT AT 2,29; INV
ERSE 1;"£";AT 4,1;"Funds"; INVER
SE 0;" (";t-4;")": LET x=b(q,6):
 GO SUB 20
 325 LET sh=0: FOR k=1 TO 7: LET
 sh=sh+b(q,11+k): LET b(q,11+k)=
0:: NEXT k: LET b(q,12)=sh
 330 LET m=7: PRINT AT 7,1; PAPE
R 5;"Plus": PRINT AT 8,1;"Taxes"
 335 PRINT AT 8,18; PAPER 6;"(";
b(q,24)*h;"%";")": LET x=INT b(q
,70): GO SUB 20
 337 IF b(q,10)<0 THEN  LET b(q,
10)=0
 340 LET m=11: PRINT AT 11,1; IN
K 7; PAPER 2;"Minus": PRINT AT 1
2,1;"Fleet ("; PAPER 5;sh; PAPER
 7; PAPER 7;" old + "; PAPER 5;b
(q,19); PAPER 7;" new)": LET x=I
NT ((b(q,19)*m1*20)/(b(q,10)+10)
+b(q,73)+sh*m1): GO SUB 20
 342 LET b(q,12)=b(q,12)+b(q,19)
: LET so=b(q,32)+b(q,37)+b(q,42)
 345 PRINT AT 13,1;"Soldiers";AT
 13,18;"("; INK 2; INVERSE 1;so;
 INK 0; INVERSE 0;")": LET x=m2*
so: GO SUB 20
 350 PRINT AT 14,1;"Crop subsidi
es": LET x=b(q,69): GO SUB 20
 355 PRINT AT 15,1;"Spies": LET
x=b(q,1): GO SUB 20
 357 IF b(q,6)<0 THEN  PRINT AT
16,1;"Interest";AT 16,18; PAPER
6;"(";int*h;"%)": LET x=INT (int
*-b(q,6)): LET b(q,6)=b(q,6)-x:
LET x$=STR$ x: PRINT AT 16,31-LE
N x$;x$
 360 LET b(q,6)=INT (b(q,6)+b(q,
70)-sh*m1-(b(q,19)*m1*20/(b(q,10
)+10))-so*m2-b(q,69)-b(q,1)-b(q,
73)): LET b(q,19)=0: LET b(q,73)
=0
 362 PLOT 200,26: DRAW 48,0
 365 LET m=18: PRINT AT 19,1; IN
VERSE 1;"Funds"; INVERSE 0;" (";
t;")": LET x=b(q,6): GO SUB 20
 366 LET b(q,69)=0: LET b(q,1)=0
 370 GO SUB 10: BORDER 7: CLS
 400 FOR y=1 TO 21: PRINT AT y,1
; PAPER 5; INK 7;"AAAAAAAAAAAAAA
AAA": NEXT y: IF f=10 THEN  RETU
RN
 405 PRINT AT 0,21; INVERSE 1;FN
 g$(n$,q)
 410 IF CODE c$(q,1)<>32 THEN  L
ET z=q: GO SUB 8500: GO TO 420
 415 PRINT AT 3,19;"No colonies"
;AT 4,19;"founded yet.": GO SUB
10
 417 LET a=3: LET b=6: GO SUB 30
 420 LET m=1: INK 7: PAPER 5: PR
INT AT 2,19;"Fleet": LET x=b(q,1
2): GO SUB 20
 425 INK 7: PAPER 2: PRINT AT 3,
19;"Army": LET x=so: GO SUB 20
 430 INK 7: PAPER 4: PRINT AT 4,
19;"Old settlers": LET m=4: LET
x=b(q,20): GO SUB 20
 432 GO SUB 15
 435 LET m=6: PAPER 6: PRINT AT
6,19;"New settlers": LET x=b(q,2
1): GO SUB 20: PAPER 7
 450 GO SUB 28: PRINT AT 10,19;"
Which do you";AT 11,19;"wish to
use?"
 455 PRINT AT 13,19; INK 1;"1 Sh
ips"
 456 PRINT AT 14,19; INK 2;"2 So
ldiers"
 457 PRINT AT 15,19; INK 3;"3 Sp
ies"
 458 PRINT AT 16,19; INK 4;"4 Cr
op change"
 460 PRINT AT 17,19; INK 3;"5 Ta
x change"
 461 PRINT AT 18,19; INK 2;"6 Wa
r"
 463 PRINT AT 19,19;"7 Nothing"
 470 LET n=7: GO SUB 35
 480 GO SUB 28
 485 GO TO (CODE x$-48)*h+400
 500 IF ch=1 THEN  PRINT AT 15,1
9;"All done.": GO TO 450
 505 PRINT AT 9,19;"What do you"
;AT 10,19;"wish to do?"
 510 LET m=11: FOR y=1 TO 9: PRI
NT AT 11+y,18;y;"(sp)";FN g$(h$,
y): IF y<8 THEN  LET x=b(q,12+y)
: GO SUB 20
 512 NEXT y
 515 LET n=9: GO SUB 35
 522 IF f=15 THEN  LET f=0: GO T
O 532
 525 LET s=VAL x$: IF s=9 THEN
GO SUB 28: GO TO 555
 527 IF s=8 THEN  GO TO 550
 530 INPUT "How many ships ? ";x
$: LET n=9: GO SUB 40: LET ch=1
 532 LET i=VAL x$: IF s=7 AND i>
10 THEN  LET i=10000: GO TO 535
 533 IF s=7 THEN  LET b(q,19)=i:
 LET m=17: LET x=i:: GO SUB 20:
LET i=0: GO TO 515
 535 IF i>b(q,12) THEN  BEEP .5,
.5: PRINT AT 21,18; FLASH 1;"Too
 many(2*sp)": GO TO 530
 540 LET b(q,12)=b(q,12)-i: LET
b(q,s+12)=i: LET m=10+s: LET x=i
: GO SUB 20: LET m=1: LET x=b(q,
12): PAPER 5: INK 7: FLASH 1: GO
 SUB 20: GO SUB 15: FLASH 0
 545 IF b(q,12)>0 THEN  GO TO 51
5
 547 IF b(q,12)<=0 THEN  GO TO 5
55
 550 INPUT "How much money ? ";x
```

continued on page 108

continued from page 107

```
$
 552 IF CODE x$>48 AND CODE x$<5
8 THEN LET b(q,73)=VAL x$: LET
m=18: LET x=VAL x$: GO SUB 20: P
RINT AT 19,30-INT LEN x$;"£": GO
 TO 545
 555 FOR k=13 TO 18
 556 GO SUB 28: IF b(q,k)=0 THEN
  NEXT k: GO TO 450
 557 PRINT AT k-1,21; FLASH 1;FN
 g$(h$,k-12)
 558 IF k=13 THEN  GO SUB 8600
 560 IF k=14 OR k=17 THEN  GO SU
B 8700
 595 NEXT k
 596 GO TO 450
 600 LET a=15: GO SUB 29: LET g=
7: PRINT AT 14,28;"Men": LET m=1
5: FOR z=1 TO 3: PRINT AT 15+z,1
9;"Force ";z: LET x=b(q,27+z*5):
 GO SUB 20: NEXT z
 605 IF f=5 THEN  LET f=0: GO TO
 653
 606 FOR y=1 TO 3: PRINT AT 15+y
,25; INVERSE 1;y: PAUSE 50: IF f
f=0 AND b(q,25+5*y)<=0 THEN  NEX
T y: GO TO 650
 607 LET a=b(q,25+5*y): LET b=b(
q,26+5*y): LET y$="C": PRINT AT
a,b;y$: PAUSE h: IF ff=1 THEN  L
ET g=0: NEXT y: LET ff=0: LET q=
qq: GO SUB 10: GO TO 700
 608 LET g=7: LET f=2: GO SUB 86
17: IF x$="x" OR b(q,28+5*y)<=0
THEN  NEXT y: GO TO 650
 610 IF a(b,a)=0 THEN  PRINT AT
a,b; PAPER 7; INK 5;"A": PRINT A
T 21,20;"sea": GO SUB 75: GO TO
608
 612 GO SUB 8410
 620 GO SUB 50: PRINT AT a,b; PA
PER c;y$
 625 LET b(q,28+5*y)=b(q,28+5*y)
-1: GO SUB 65: IF c=0 THEN  GO S
UB 8636
 630 LET b(q,25+5*y)=a: LET b(q,
26+5*y)=b: IF b(q,28+5*y)<=0 THE
N  NEXT y: GO TO 650
 635 GO TO 608
 650 LET a=8: GO SUB 29: LET f=5
: GO TO 600
 653 FOR y=1 TO 3: PRINT AT 15+y
,25; FLASH 1;y: IF y>1 THEN  PRI
NT AT 15+y-1,25; INVERSE 1;y-1
 655 INPUT "Recruiting how many
? ";x$
 660 IF CODE x$<48 OR CODE x$>57
 THEN  BEEP .5,.5: PRINT AT 21,1
9;"Try again": GO TO 655
 665 IF VAL x$>500 THEN  LET x$=
"a": GO TO 660
 670 LET b(q,29+5*y)=VAL x$: NEX
T y
 695 GO TO 450
 700 PRINT AT 9,22; PAPER 3; INK
 7;"SPIES"
 705 LET a=10: GO SUB 29: PRINT
AT 11,19;"Spy on whom?"
 710 LET m=1: FOR x=1 TO p
 712 IF x=q THEN  NEXT x: GO TO
718
 714 IF CODE n$(x*8-7)=32 THEN
PRINT AT 12+m,20; INK x;x;"(sp)"
;n$(8*x-6 TO 8*x): LET m=m+1: NE
XT x: GO TO 718
 715 PRINT AT 12+m,20; INK x;x;"
(sp)";FN g$(n$,x): LET m=m+1
```



```
 717 NEXT x
 718 PRINT AT 12+m,20;p+1;"(2*sp
)";"NOBODY": IF f=6 THEN  PRINT
AT 19,19;"(One only)"
 720 LET n=p+1: GO SUB 35
 730 LET z=VAL x$: IF z=q THEN
BEEP .5,.5: GO TO 720
 735 IF z=p+1 THEN  LET f=0: GO
TO 450
 736 IF f=6 THEN  LET b(q,5)=z:
LET f=0: GO TO 450
 740 LET a=11: GO SUB 29
 742 LET b(q,1)=b(q,1)+h
 745 PRINT AT 11,20;"For what ?"
 750 PRINT AT 13,20; INK 3;"1 Fi
nances";AT 14,20; INK 4;"2 Colon
ies";AT 15,20; INK 1;"3 Ships";A
T 16,20; INK 2;"4 Troops";AT 17,
20; INK 4;"5 Crops";AT 18,20; IN
K 2;"6 War plans"
 752 LET n=6: GO SUB 35
 755 LET a=11: GO SUB 29
 760 LET s=VAL x$: IF s<>5 THEN
 PRINT AT 11,21; INVERSE 1;FN g$
(n$,z)
 762 IF s=1 THEN  PRINT AT 13,19
;"Funds:£": LET m=12: LET x=INT
(b(z,6)*(1+RND-RND)): GO SUB 20:
 PRINT AT 14,19;"Tax(%)": LET x=
INT (b(z,24)*h+RND/20-RND/20): G
O SUB 20: GO SUB 10: GO TO 700
 763 LET f=0: IF s=5 AND b(z,11)
>0 THEN  LET f=2
 765 IF s=5 THEN  LET m=9: FOR n
=1 TO cr+f: PRINT AT 9+n,19;FN g
$(f$,n): LET x=b(z,55+n): GO SUB
 20: PRINT AT m,31;"%": NEXT n:
GO SUB 10: GO TO 700
 770 IF s=2 THEN  GO SUB 8500: G
O TO 700
 775 IF s=3 THEN  LET m=14: PRIN
T AT 13,19;"Fleet": FOR n=1 TO 7
: PRINT AT 14+n,19;FN g$(h$,n):
LET x=b(z,12+n): GO SUB 20: NEXT
 n: GO SUB 10: GO TO 700
 780 IF s=4 THEN  LET qq=q: LET
q=z: LET ff=1: GO TO 600
 785 IF s=6 AND b(z,5)<>0 THEN
PRINT AT 13,21;"Plans to";AT 14,
21;"attack";AT 15,21; FLASH 1; I
NK b(z,5);FN g$(n$,b(z,5)): PAUS
E 200: GO TO 700
 787 IF s=6 AND b(z,9)<>0 THEN
PRINT AT 13,21;"Attacking";AT 14
,21; FLASH 1; INK b(z,9);FN g$(n
$,b(z,9)): PAUSE 200: GO TO 700
 790 IF s=6 THEN  PRINT AT 14,21
;"No plans": PAUSE h: GO TO 700
 800 LET f=0: PRINT AT 8,19; PAP
ER 4; INK 7;"CROP CHANGE"
 802 IF b(q,11)>0 AND cr=7 THEN
 LET f=2
 805 LET a=10: GO SUB 29
 810 LET m=9: FOR y=1 TO cr+f: P
RINT AT 9+y,19;FN g$(f$,y): LET
x=b(q,55+y): GO SUB 20: PRINT AT
 9+y,31;"%": NEXT y
 815 LET w=0: FOR y=1 TO cr+f: P
RINT AT 9+y,19; FLASH 1;FN g$(f$
,y): IF y>1 THEN  PRINT AT 8+y,1
9;FN g$(f$,y-1)
 816 IF (y=8 OR y=9) AND b(q,11)
<=0 THEN  LET b(q,55+y)=0: GO TO
 835
 817 IF y=5 AND b(q,10)<=0 THEN
 LET b(q,60)=0: GO TO 835
 820 INPUT "What percentage ? ";
x$: LET n=9: GO SUB 40
 822 LET z=VAL x$: IF z>h THEN
BEEP .5,.5: PRINT AT 21,19;"Too
much": GO TO 820
 825 IF z>b(q,55+y) THEN  LET b(
q,69)=INT ((b(q,69)+(z-b(q,55+y)
)*b(q,8))*b(q,24)*2)
 830 LET w=w+z: LET b(q,55+y)=z:
 LET x=z: LET m=8+y: GO SUB 20
 832 IF w=h THEN  FOR w=y+1 TO c
r+f: LET x=0: GO SUB 20: LET b(q
,55+w)=0: NEXT w: PRINT AT 21,19
;"All done.": LET y=cr+f
 835 NEXT y
 840 LET y=0: FOR x=1 TO 12: LET
 y=y+b(q,55+x): NEXT x
 845 IF y>100 THEN  LET a=9: GO
SUB 29: PRINT AT 10,19;"Your pla
nned";AT 11,19;"output is";AT 12
,19;"above 100%.";AT 14,19;"Try
again!": PAUSE 200: GO TO 800
 895 PAUSE h: GO TO 450
 900 PRINT AT 9,19; INK 7; PAPER
 3;"TAX CHANGE"
 910 PRINT AT 12,19;"Old rate":
LET x=b(q,24)*h: LET m=11: GO SU
B 20: PRINT AT 12,31;"%"
 915 PRINT AT 14,19;"New rate ?"
;AT 16,19;"(Between 10";AT 17,19
;"and 50 %)": PRINT AT 14,31;"%"
 920 LET n=9: GO SUB 35
 925 LET x=INT VAL x$: IF x>50 O
R x<10 THEN  BEEP .5,.5: GO TO 9
15
 930 LET b(q,24)=x/h: LET m=13:
GO SUB 20
 945 PAUSE h: GO TO 450
1000 LET b(q,5)=0: PRINT AT 9,22
; INK 7; PAPER 2;"WAR"
1010 IF b(q,9)>0 THEN  LET y=b(q
,9): PRINT AT 11,19;"You are now
";AT 12,19;"attacking";AT 13,19;
 INK y; FLASH 1;FN g$(n$,y): GO
TO 1020
1015 PRINT AT 11,19;"You are not
";AT 12,19;"attacking.";AT 13,19
;"anyone."
1020 PRINT AT 15,19;"You are bei
ng";AT 16,19;"attacked by"
1025 LET m=17: FOR k=1 TO p
1027 IF b(k,9)=q THEN  PRINT AT
m,19; INK k; FLASH 1;FN g$(n$,k)
: GO SUB 7
1028 NEXT k
1030 IF m=17 THEN  PRINT AT m,19
;"nobody."
1035 GO SUB 10: LET a=11: GO SUB
 29
1040 PRINT AT 9,19;"Next turn,";
AT 10,19;"do you plan";AT 11,19;
"to attack": LET f=6: GO TO 710
1200 GO TO 210
5000 BORDER 7: PRINT AT 20,6; FL
ASH 1;FN g$(n$,z); FLASH 0;" has
 won   !"
5010 COPY : GO SUB 10
5020 CLS : LET f=10: GO SUB 400
5030 PRINT AT 0,3; INK 1;"THE NE
W WORLD": FOR z=1 TO p: GO SUB 8
500: NEXT z
5055 GO SUB 9100
5060 COPY : INPUT "Press any key
 for rematch! ";x$
5070 CLEAR : RUN
6000 IF a(b,a)<58 THEN  GO TO 61
00
6010 LET aa=a: LET bb=b: LET a=1
5: GO SUB 29
6012 LET c=INT (a(bb,aa)/10)-5
6013 IF d(c,q)=1 THEN  GO SUB 60
50: GO SUB 6085: RETURN
6015 PRINT AT 15,19;"You find";A
T 16,19;"the "; FLASH 1;e$(c)
6020 PRINT AT 18,19;"Will you";A
T 19,19;"1 Fight";AT 20,19;"2 Tr
ade"
6025 INPUT "Strategy (1-2) ?";x$
6030 IF CODE x$<49 OR CODE x$>50
 THEN  BEEP .5,.5: GO TO 6025
6032 LET a=18: LET b=21: GO SUB
30: LET d=VAL x$(1)
6035 IF d(c,q)=0 THEN  LET d(c,q
)=INT (2+3.4*RND)
6040 LET a=aa: LET b=bb: IF d=1
THEN  LET d(c,q)=5
6045 IF d(c,q)<5 AND y$="C" THEN
  LET a=a-m: LET b=b-n
6050 IF d(c,q)<5 THEN  PRINT AT
19,19;"They";AT 20,18;s$(d(c,q)*
12-11 TO d(c,q)*12);AT 21,19;"yo
u": PAUSE 50: RETURN
6060 PRINT AT 18,21; FLASH 1;"BA
TTLE!": IF y$="C" THEN  LET v=b(
q,27+5*y)/(d(c,6)+1)
6065 PAUSE h: IF y$="E" THEN  LE
T v=b(q,k)*25/(d(c,6)+1)
6070 LET d(c,6)=INT (d(c,6)-v*d(
c,6)): IF d(c,6)<=0 OR v>1 THEN
 PRINT AT 19,21; FLASH 1;"VICTOR
Y": LET d(c,q)=1: PRINT AT 20,19
;"Land and";AT 21,19;"slaves tak
en": GO TO 6085
6075 PRINT AT 19,21; FLASH 1;"DE
FEAT!": IF y$="C" THEN  LET b(q,
27+5*y)=INT (b(q,27+5*y)*(.9-RND
/2)): LET a=a-m: LET b=b-n: RETU
RN
```

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QUALITY CONTROL FROM CREATIVE SPARKS ON SPECTRUM 48K

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STAGECOACH

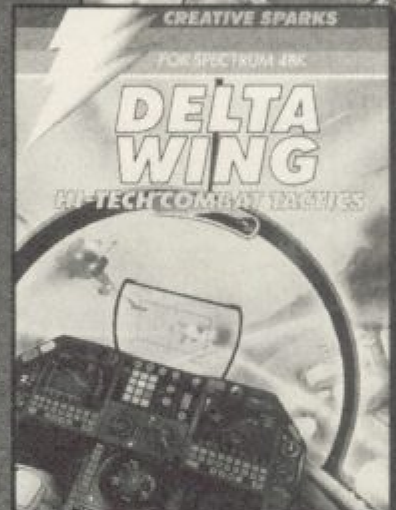
A western action game for your Spectrum which really does provide something quite different and exciting. You are Kidd Rivers, the hero of the game and you must leap aboard the runaway stage and guide it safely over the plains and through the treacherous mountains. Then just as you thought you were safe, fight off the attacking Indians.



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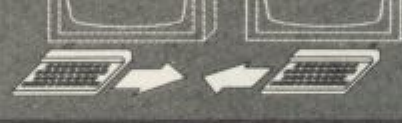


DELTA WING

Delta Wing is an advanced flight combat simulator. It has been designed to give an excellent 'feel' for the tumble and roll of high speed flight. With 15 separate controls to monitor and incoming enemy planes to be dealt with, this program takes you and your Spectrum to the limits.

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SU0185

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```
6080 IF b(q,13)>1 THEN  LET b(q,
k)=INT (b(q,13)*.9)
6082 RETURN
6085 LET a=aa: LET b=bb: LET b(q
,22)=b(q,22)+INT (300*RND): LET
a(b,a)=a(b,a)-10*c: GO SUB 8636
6090 RETURN
6105 GO SUB 65: IF c=q THEN  RET
URN
6110 IF c<>b(q,9) AND y$="C" THE
N  GO SUB 75: LET m=0: LET n=0
6115 IF c<>b(q,9) THEN  RETURN
6117 IF y$="E" THEN  RETURN
6120 LET g=1: LET k=q: LET r=b(q
,9): GO SUB 8845
6125 IF g=2 THEN  PRINT AT 20,19
;"Enemy";AT 21,19;"attacked": LE
T b(q,28+5*y)=0: RETURN
6127 GO SUB 50: LET a(b,a)=c: LE
T g=5: LET v=b(q,9): GO SUB 8636
: GO SUB 8887: LET g=0
6130 RETURN
6500 PRINT  PAPER 6;"N.B. In all
 cases, players must occupy the
lands of submissive  natives to
control them."
6510 PAUSE h: LET nb=t: RETURN
6700 LET ww=0: FOR k=1 TO p: LET
 b(k,8)=0
6710 LET z=1: IF CODE c$(k,1)=32
 THEN  GO TO 6750
6715 LET b=VAL c$(k,z TO z+1): L
ET a=VAL c$(k,z+2 TO z+3)
6720 GO SUB 50: IF c>6 THEN  GO
TO 6722
6721 LET b(k,8)=b(k,8)+c
6722 IF CODE c$(k,z+4)<>32 THEN
 LET z=z+4: GO TO 6715
6725 IF z>240-p*20 THEN  LET ww=
1
6730 LET b(k,7)=z
6750 NEXT k
6760 RETURN
6800 CLS : PRINT AT 3,0;"You hav
e been recklessly extra- vagant
and owe your Italian     bankers
 "; INK 2;"£";-INT b(q,6)
6805 LET m=7
6810 IF b(q,19)>2 THEN  PRINT AT
 m,0;"They refuse to pay for hal
f yournew ships": LET m=m+3: LET
 z=19: GO SUB 55
6815 IF b(q,32)+b(q,37)+b(q,42)>
400 THEN  PRINT AT m,0;"They ref
use to pay your army:   desertio
n is rife.": LET z=32: GO SUB 55
: LET z=37: GO SUB 55: LET z=42:
 GO SUB 55: LET m=m+3
6825 IF m>9 THEN  PRINT AT 20,0;
"With friends like these ..."
6830 GO SUB 10: RETURN
7000 LET f=0: BORDER 0: PAPER 6:
 CLS : PRINT AT 9,2;"All decisio
ns have been made.   Their conse
quences will now     be revealed
."
7005 GO SUB 10
7007 LET y=0: FOR k=1 TO p: IF b
(k,9)>0 THEN  LET y=1
7008 NEXT k: IF y=0 THEN  GO TO
7100
7010 PAPER 5: CLS : PRINT AT 1,1
3; INVERSE 1;"WARS"
7012 FOR k=1 TO p: PAUSE h: CLS
7015 LET r=b(k,9): IF r<=0 THEN
 NEXT k: GO TO 7100
7017 LET r=b(k,9): IF r>0 THEN
PRINT AT 3,0;FN g$(n$,k);" is at
 war with ";FN g$(n$,r)
7018 LET m=4: IF b(k,14)<=0 THEN
  GO TO 7032
7020 PRINT AT 4,0;"- invasion by
 sea"
7021 PRINT AT 21,0; PAPER 4;"(10
*sp)"; INK 5; PAPER 7;"AAAAAAAAA
AAAAAAAAAAAAA": PRINT AT 20,RND*
3; INK 6;"(2*ig3)": PRINT AT 20,
RND*3;"H";AT 20,2+RND*3;"F"
7022 LET x$="E E E(13*sp)": FOR
x=5 TO 15: PRINT AT 20,32-f-x; I
NK 2;x$(1 TO x): PAUSE 8: NEXT x
: IF f=7 THEN  LET f=0: RETURN
7025 IF b(k,14)/(b(r,18)+1)<2 TH
EN  PRINT AT 20,11; INK 1;"B B":
 PRINT AT m,17;":sea battle": LE
T w=k: LET x=14: LET y=r: LET z=
18: GO SUB 8800: GO SUB 7
7027 IF b(k,14)<=0 THEN  FOR l=1
 TO 3: IF b(k,27+5*l)=-1 THEN  L
ET b(k,25+5*l)=0: LET l=3
7028 IF b(k,14)<=0 THEN  NEXT l:
 GO TO 7050
7030 GO SUB 7: PRINT AT m,2;"for
ce landed": LET f=7: GO SUB 7022
: PRINT AT 20,8; INK 2;"II": GO
SUB 7
7032 LET g=0: FOR y=1 TO 3
7033 GO SUB 8850
7034 NEXT y
7035 IF b(k,15)<=0 THEN  GO TO 7
050
7037 LET f=7: PRINT AT m,0;"- bl
ockade": GO SUB 7021
7040 LET w=k: LET x=15: LET y=r:
 LET z=18: GO SUB 8800: GO SUB 7
7045 IF f=1 THEN  LET f=0: LET w
=(b(r,18)+5)/(b(k,15)+5): IF w<1
 THEN  LET b(r,74)=b(r,74)*w
7050 IF b(k,16)<=0 THEN  GO TO 7
095
7055 GO SUB 7: PRINT AT m,0;"- p
iracy"
7060 PRINT AT 20,0;"(32*sp)": PR
INT AT 21,0; INK 5; PAPER 7;"(32
*A)": LET x$="(sp)B B B": FOR x=
1 TO 12: PRINT AT 20,x; INK 1;x$
: NEXT x: PRINT AT 20,22; INK 2;
"E E"
7065 LET w=k: LET x=16: LET y=r:
 LET z=17: GO SUB 8800: GO SUB 7
7070 IF f=1 THEN  LET f=0: LET w
=(b(k,16)+5)/(b(r,17)+5): IF w>1
 THEN  LET b(k,75)=w-1: IF b(k,7
5)>.4 THEN  LET b(k,75)=.3+RND/1
0
7080 PAUSE h
7095 NEXT k
7100 GO SUB 15: LET f=0: CLS : P
RINT AT 1,6; INVERSE 1;"COLONIAL
  PRODUCTION": PRINT AT 2,10;"(s
hiploads)"
7101 GO SUB 6700
7102 FOR k=1 TO p: LET b(k,2)=0
7103 IF INT b(k,8)=0 THEN  GO TO
 7110
7105 LET b(k,2)=(b(k,20)+2*b(k,2
2))/(b(k,8)+1): IF b(k,2)<1 THEN
  LET b(k,2)=b(k,2)*b(k,8): GO T
O 7110
7107 LET y=0: FOR x=1 TO INT b(k
,2): LET y=y+1/x: NEXT x: LET b(
k,2)=b(k,8)*y: IF b(k,11)>0 AND
cr=7 THEN  LET f=2
```

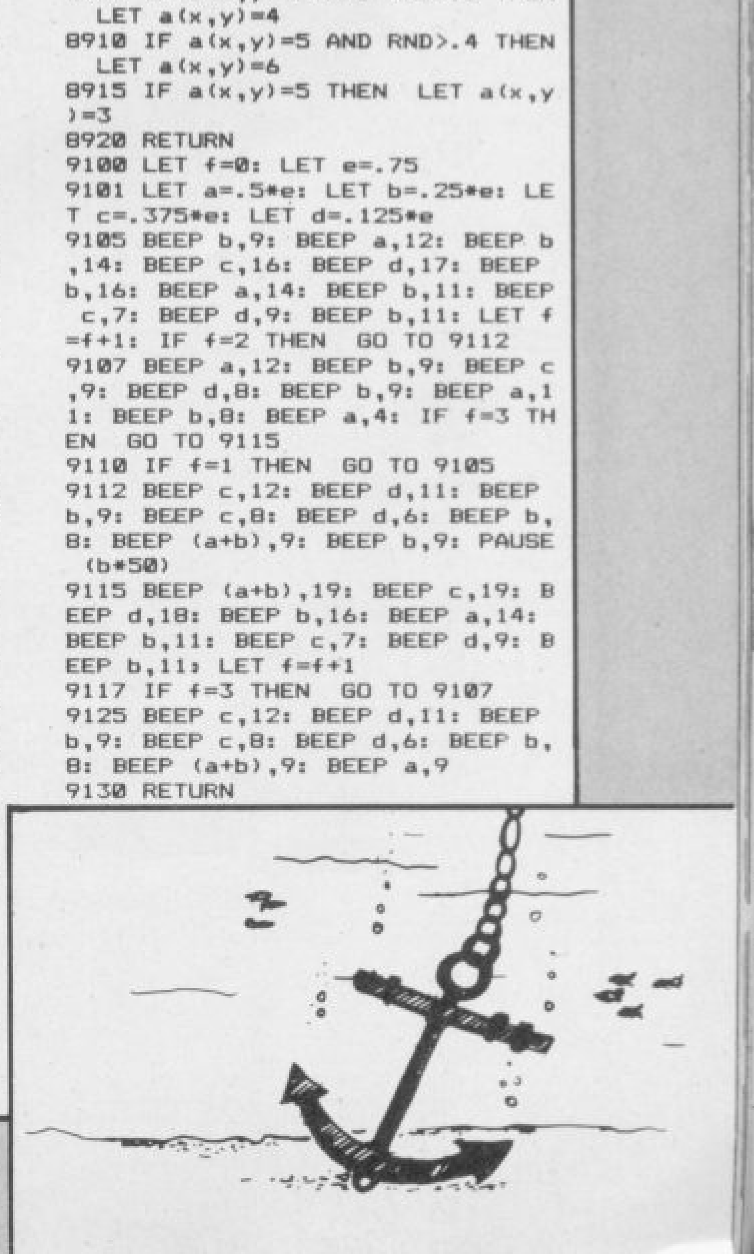
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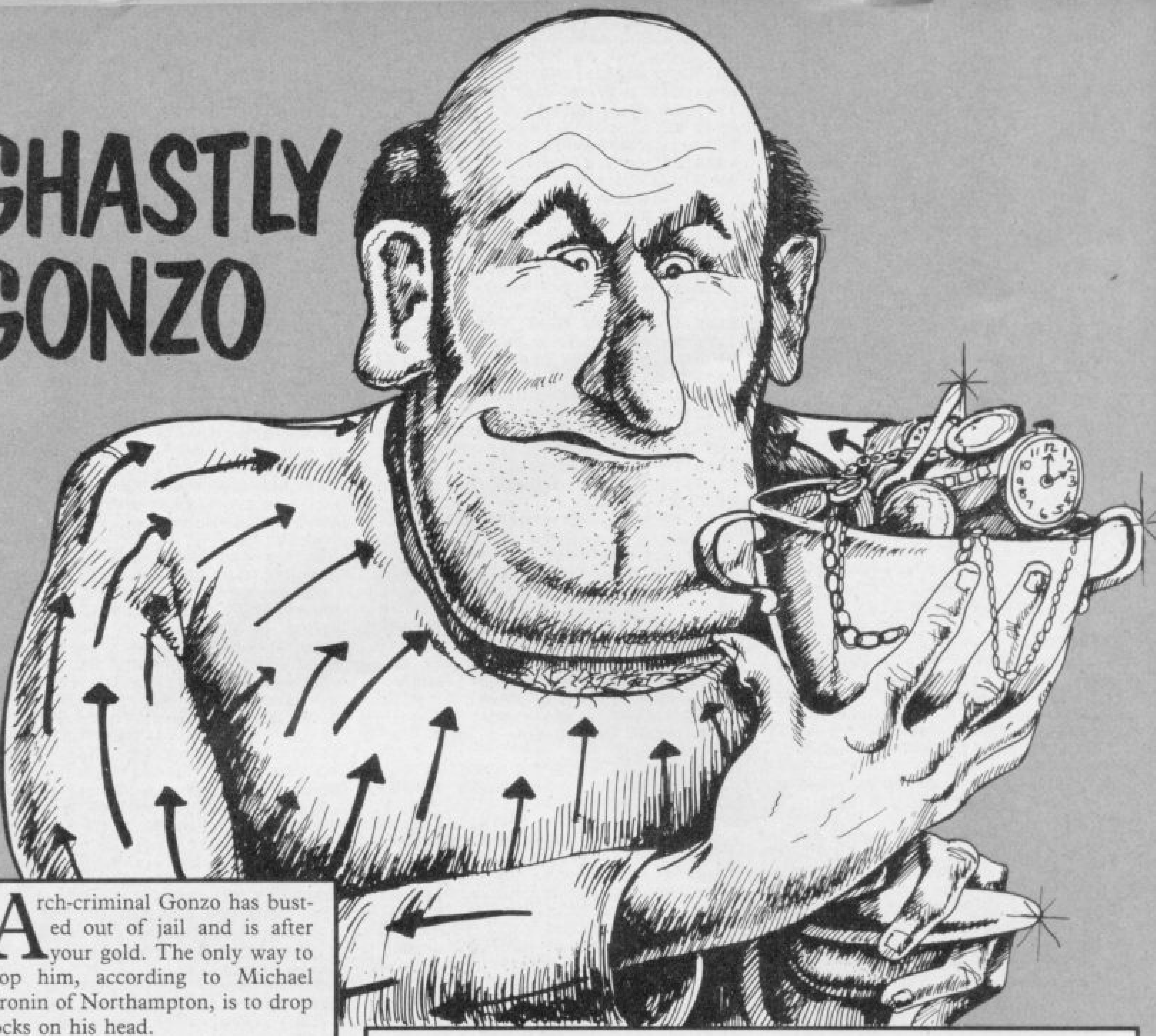
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7108 IF b(k,63)>RND*50 OR b(k,64
)>RND*h THEN  LET b(k,2)=b(k,2)*
(.9-RND/3)
7110 NEXT k
7120 FOR x=1 TO cr+f: PRINT AT 8
+x,0;FN g$(f$,x): NEXT x: FOR x=
1 TO p: PRINT AT 5,5+(10-p)*x; I
NK x;i$(x): NEXT x
7125 FOR k=1 TO p: FOR l=1 TO cr
+f: LET x$=STR$ (INT (.5+b(k,2)*
b(k,55+l)/h)): PRINT AT 8+l,6+(1
0-p)*k-LEN x$;x$: NEXT l: NEXT k
7130 GO SUB 10: LET g=0
7132 LET l=0: FOR k=1 TO p
7133 IF b(k,74+g)<>1 AND b(k,74+
g)<>0 THEN  LET l=1
7134 NEXT k: IF l=0 THEN  GO TO
7150+g
7135 IF g=1 THEN  GO TO 7151
7136 PRINT AT 1,4; INVERSE 1;"LO
SSES THROUGH BLOCKADE "
7137 FOR k=1 TO p
7138 IF b(k,74)<.1 THEN  LET b(k
,74)=.1+RND/10
7140 NEXT k
7142 FOR k=1 TO p: FOR l=1 TO cr
+f: LET x$=" "+STR$ (INT ((b(k,
2)*b(k,55+l)-b(k,2)*b(k,55+l)*b(
k,74))/h)): PRINT AT 8+l,6+(10-p
)*k-LEN x$;x$: NEXT l: NEXT k
7145 GO SUB 10
7150 LET g=1: GO TO 7132
7151 IF l=0 THEN  GO TO 7180
7155 PRINT AT 1,2; INVERSE 1;"GA
INS/LOSSES THROUGH PIRACY"
7157 FOR k=1 TO p
7158 IF b(k,75)>.24 THEN  LET b(
k,75)=.2+RND/21
7165 LET r=b(k,9): FOR l=1 TO cr
+f
7166 IF r=0 THEN  LET x=0: GO TO
 7168
7167 LET x=b(k,75)*b(r,2)*b(r,55
+l)*b(r,74)
7168 LET b(k,76)=0: LET y=0: FOR
 m=1 TO p
7170 IF m=k THEN  GO TO 7172
7171 IF b(m,9)=k THEN  LET y=y+b
(m,75)
7172 NEXT m
7175 LET b(k,76)=y: LET x$=" "+S
TR$ INT ((x-b(k,2)*b(k,55+l)*y)/
h): IF LEN x$=2 THEN  LET x$=" "
+x$
7176 IF VAL x$>0 THEN  LET x$(1
TO )="+"+x$(2 TO )
7177 PRINT AT 8+l,6+(10-p)*k-LEN
 x$;x$: NEXT l: NEXT k
7178 GO SUB 10
7180 CLS : FOR k=1 TO p: LET b(k
,2)=b(k,2)*b(k,74)*(1-b(k,76)):
NEXT k
7185 GO SUB 15: PRINT AT 1,9; PA
PER 1; INK 7;"SALES IN EUROPE":
PRINT AT 1,27;t: PRINT AT 3,7; I
NK 1;"Total";AT 4,7;"sales";AT 5
,6;"(loads)": PRINT AT 4,13; INK
 2;"Price";AT 5,14;"(£)": PLOT 1
35,103: DRAW 0,-8*(cr+f)
7187 PRINT AT 3,22; INK 3;"Marke
t";AT 4,20;"Share  (%)": FOR x=1
 TO cr+f: PRINT AT 8+x,0;FN g$(f
$,x): NEXT x: FOR x=1 TO p: PRIN
T AT 6,16+3*x; INK x;i$(x): NEXT
 x
7188 FOR k=1 TO p: LET b(k,70)=0
: NEXT k
7190 LET x=0: FOR l=1 TO cr+f: F
OR k=1 TO p: LET x=x+INT (.5+b(k
,2)*b(k,55+l)/h)
7192 IF b(k,9)>0 THEN  LET x=x+I
NT (.5+b(b(k,9),2)*b(b(k,9),55+l
)*b(k,75)/h)
7193 NEXT k: LET q(l,5)=x: LET x
$=STR$ x: PRINT AT 8+l,12-LEN x$
;x$: IF x=0 THEN  LET q(l,4)=q(l
,4)+INT (RND*5)
7195 IF x>0 THEN  LET q(l,1)=q(l
,1)*q(l,2): LET q(l,4)=INT (q(l,
4)+(q(l,1)-x)/q(l,1)*q(l,3)): LE
T q(l,1)=(q(l,1)*3+x)/4
7196 IF q(l,4)<=0 THEN  LET q(l,
4)=1+INT (5.3*RND)
7197 IF q(l,4)>500 THEN  LET q(l
,4)=INT (400+RND*h)
7200 LET x$=STR$ q(l,4): PRINT A
T 8+l,16-LEN x$;x$
7205 FOR k=1 TO p: LET y=INT (.5
+b(k,2)*b(k,55+l)/h)
7207 IF b(k,9)>0 THEN  LET y=y+I
NT (.5+b(b(k,9),2)*b(b(k,9),55+l
)*b(k,75)/h)
7208 IF x>0 THEN  LET y=INT (h*y
/x+.5): LET b(k,70)=b(k,70)+INT
(y*q(l,4)*q(l,5)*b(k,24)/h)
7210 IF y>0 THEN  LET x$=" "+STR
$ y: PRINT AT 8+l,17+3*k-LEN x$;
x$
7212 NEXT k
7215 LET x=0: NEXT l
7220 COPY : GO SUB 10
7225 CLS : PRINT AT 1,5; PAPER 4
;"NATIVE TRADING/LOOTING": FOR k
=1 TO p: LET b(k,2)=0: NEXT k
7230 FOR x=1 TO 21: LET y=0: FOR
 k=1 TO p
7235 IF d(x,k)=1 THEN  LET b(k,2
)=b(k,2)+d(x,7)
7236 IF d(x,k)=2 OR d(x,k)=3 THE
N  LET y=y+1
7240 NEXT k
7245 IF y=0 THEN  GO TO 7255
7247 FOR k=1 TO p
7248 IF d(x,k)=2 OR d(x,k)=3 THE
N  LET b(k,2)=b(k,2)+INT (d(x,7)
/y)
7250 NEXT k
7260 NEXT x
7270 PRINT AT 3,18;"Value of";AT
 4,14;"native trade (£)": FOR x=
1 TO p: LET y=b(x,2)*b(x,74)*(1-
b(x,76)): LET b(x,70)=b(x,70)+IN
T (y*b(x,24)): PRINT AT 6+2*x,2;
 INK x;m$(10*x-9 TO 10*x): LET x
$=STR$ INT b(x,2): PRINT AT 6+2*
x,23-LEN x$;x$: NEXT x:
7275 GO SUB 10
7277 LET f=0
7280 CLS : PRINT AT 1,10; INK 7;
 PAPER 3;"How to win.": PRINT AT
 4,1;"The game ends when one pla
yer    has about "; INVERSE 1;60-
p*5; INVERSE 0;" blocks of land.
": PRINT AT 6,1;"Players score"
7285 PRINT AT 9,3; PAPER 5;"1000
"; PAPER 7;" points for each are
a       of land";AT 13,3;"and";A
T 16,3; PAPER 5;"1"; PAPER 7;" p
oint for each pound in        the
 Treasury (or "; INK 7; PAPER 2;
"-1"; INK 0; PAPER 7;" per
   pound of debt)."
7286 IF f=1 THEN  PRINT AT 20,0;
"(The map for this game is being
  generated.)": RETURN
7287 GO SUB 10
7290 CLS : PRINT AT 3,17;"Points
"
7292 FOR x=1 TO p
7295 IF CODE n$(x*8-7)=32 THEN
PRINT AT 5+2*x,6; INK x;n$(8*x-6
 TO 8*x): GO TO 7300
7296 PRINT AT 5+2*x,6;FN g$(n$,x
)
7300 NEXT x
7302 LET z=1: LET yy=-10000: FOR
 x=1 TO p: LET y=b(x,7)*250+b(x,
6)+b(x,70)
7306 IF y>yy THEN  LET z=x: LET
yy=y
7320 LET x$=STR$ INT y: PRINT AT
 5+2*x,23-LEN x$;x$: NEXT x
7330 PRINT AT 20,6; FLASH 1;FN g
$(n$,z); FLASH 0;" is winning!"
7340 IF ww=1 THEN  GO TO 5000
7350 COPY : GO SUB 10
7430 PAUSE h: CLS : PRINT "EVENT
S": PRINT " ": FOR k=1 TO p
7432 LET z=1
7450 LET x=b(k,8)/(b(k,7)+1): IF
 x<.6 THEN  LET x=.6
7452 IF x>1.1 THEN  LET x=1.1
7455 LET b(k,20)=INT (b(k,20)*x)
7457 FOR y=1 TO 3: LET b(k,27+5*
y)=INT (b(k,27+5*y)*x): NEXT y
7460 LET b(k,22)=INT (b(k,22)*(x
-.2)): IF x-.2<.6 AND RND>.7 THE
N  PRINT "Epidemic among ";m$(k*
10-9 TO k*10);" slaves"
7470 FOR x=1 TO 21
7472 IF d(x,k)=0 THEN  GO TO 748
5
7475 LET y=INT (RND*1.9-RND*1.9)
7480 LET w=d(x,k): IF y<>0 AND w
+y<6 AND w+y>0 THEN  LET d(x,k)=
w+y: PRINT "The ";e$(x);s$(d(x,k
)*12-11 TO d(x,k)*12);FN g$(n$,k
): IF d(x,k)=1 AND nb<>t THEN  G
O SUB 6500
7485 LET d(x,7)=INT (d(x,7)*(1-R
ND/3+RND/3)): NEXT x
7490 NEXT k
7500 PAUSE h: CLS : IF RND>.85 T
HEN  CLS : PRINT AT 9,0;"The POP
E proclaims peace betweenChristi
ans. No wars are allowed next tu
rn (except against the   natives
.)": FOR k=1 TO p: LET b(k,5)=0:
 NEXT k: GO TO 7900
7515 LET w=0: FOR k=1 TO p
7516 IF b(k,11)>1 THEN  LET w=1
7517 NEXT k: IF w=1 AND cr=7 THE
N  LET cr=9
7520 IF RND>.9 AND cr>8 AND cr<1
1 THEN  LET cr=cr+1: CLS : PRINT
 AT 9,0;FN g$(f$,cr);"is introdu
ced into the  New World.": GO TO
 7900
7540 GO SUB 60: IF b(k,6)>-h AND
 RND>.85 THEN  PRINT AT 9,1;"Pro
ducts from the East Indies   dis
rupt demand for your goods.": FO
R l=1 TO cr: LET q(l,1)=q(l,1)*(
1-RND/2): NEXT l: GO TO 7900
7580 CLS : GO SUB 60: IF b(k,6)>
RND*h AND b(k,24)>.25 AND RND>.5
 THEN  FOR x=1 TO p: LET b(x,70)
=b(x,70)*(1-b(x,24)): NEXT x: PR
INT AT 9,0;"All states are affec
ted by tax  evasion, (some more
than others)but savage penalties
 ensure thatit is a short-lived
phenomenon.": GO TO 7850
7600 CLS : GO SUB 60: IF b(k,6)>
RND*h AND RND>.5 THEN  PRINT AT
9,1;"Your (mercenary) forces dem
and  a pay rise.": LET m2=INT (m
2*1.2): PAUSE 300
7620 LET w=1: FOR k=1 TO p:
7622 IF b(k,25)>=b(w,25) THEN  L
ET w=k
7625 NEXT k: IF b(w,25)=1 THEN
GO TO 7900
7630 CLS : IF RND>.6 THEN  PRINT
 AT 9,0;m$(10*w-9 TO 10*w);" shi
p design boosts";AT 10,0;"receip
ts from entrepot trade.": FOR k=
1 TO p: LET b(w,70)=b(w,70)+(.1*
b(k,70)/b(k,24))
7900 GO SUB 10: GO TO 200
8000 DIM a(17,21)
8005 LET m=2+RND*4: LET n=RND*5-
RND*5+3
8010 FOR x=1 TO 21
8015 LET m=m+RND*3-RND*3: LET n=
n+RND*4-RND*4
8020 IF m>6 THEN  LET m=6-RND*2
8025 IF m<0 THEN  LET m=RND*3
8030 IF n<0 THEN  LET n=RND*3
8035 IF n>10 THEN  LET n=10-RND*
3
8037 IF x=21 THEN  LET n=4*RND:
LET m=2*RND
8040 IF m>0 THEN  FOR k=1 TO m:
LET a(7-k,x)=1: NEXT k
8045 IF n>0 THEN  FOR k=1 TO n:
LET a(6+k,x)=1: NEXT k
8050 IF x<21 AND n<6*RND THEN  L
ET a(8+n,x)=1
8055 IF n<7*RND AND RND>.7 THEN
 LET a(9+n,x)=1
8060 NEXT x
8065 FOR y=1 TO 21: FOR x=1 TO 1
7
8070 IF a(x,y)=0 THEN  GO TO 809
5
8075 LET a(x,y)=INT (3+RND*4.5):
 GO SUB 8900
```



```
8080 IF x=1 OR y=1 THEN  GO TO 8
095
8085 IF RND>.6 AND a(x,y-1)>1 TH
EN  LET a(x,y)=a(x,y-1): GO TO 8
095
8090 IF RND>.7 AND a(x-1,y)>1 TH
EN  LET a(x,y)=a(x-1,y)
8100 NEXT x: NEXT y
8200 DIM d(21,7): FOR k=6 TO 26:
 LET n=0
8210 LET x=1+RND*15: LET y=1+RND
*19
8215 IF a(x,y)=0 OR a(x,y)>7 THE
N  LET n=n+1: IF n<5 THEN  GO TO
 8210
8217 IF n>=5 THEN  GO TO 8250
8220 LET a(x,y)=a(x,y)+10*k: LET
 d(k-5,6)=99+INT (RND*1000): LET
 d(k-5,7)=RND*2000
8225 IF a(x+1,y)<>0 AND a(x+1,y)
<7 THEN  LET a(x+1,y)=a(x+1,y)+k
*10
8227 IF x<15 AND INT (a(x+1,y)/1
0)=k THEN  IF a(x+2,y)<>0 AND a(
x+2,y)<7 THEN  LET a(x+2,y)=a(x+
2,y)+k*10
8230 IF a(x,y+1)<>0 AND a(x,y+1)
<7 THEN  LET a(x,y+1)=a(x,y+1)+k
*10
8235 IF y>2 THEN  IF a(x,y-1)<>0
 AND a(x,y-1)<7 THEN  LET a(x,y-
1)=a(x,y-1)+k*10
8250 NEXT k
8260 RETURN
8410 GO SUB 50: IF a(b,a)>57 THE
N  PRINT AT a,b; PAPER c;"G": GO
 SUB 6000: RETURN
8412 IF a(b,a)<=57 AND a(b,a)>7
THEN  PRINT AT a,b; PAPER c;i$(I
NT (a(b,a)/10)+.1): GO SUB 6000:
 RETURN
8420 PRINT AT a,b; PAPER c;"(sp)
": IF y$="C" THEN  GO SUB 8636
8450 RETURN
8500 LET m=1: IF CODE c$(z,1)=32
 THEN  PRINT AT 13,20;"No coloni
es": PAUSE h: RETURN
8510 LET b=VAL c$(z,m TO m+1): L
ET a=VAL c$(z,m+2 TO m+3)
8515 GO SUB 50: PRINT AT a,b; PA
PER c;i$(z): GO TO 8525
8525 IF CODE c$(z,m+4)<>32 THEN
 LET m=m+4: GO TO 8510
8550 RETURN
8600 LET g=0: LET y$="E": PRINT
AT 14-q*2,17;y$
8605 LET 11=0: LET 1=0: LET a=14
-2*q: LET b=17
8615 LET f=1
8617 LET m=0: LET n=0: PRINT AT
15-g,19;"Where ?      ";AT 16-g,1
9;"Enter n,s,e";AT 17-g,19;"or w
": LET x$=INKEY$: IF f=2 THEN  P
RINT AT 18-g,19;"or x for next";
AT 19-g,19;"force": FOR z=14 TO
21: PRINT AT z,19;"(12*sp)": NEX
T z
8618 IF x$="" THEN  GO TO 8617
8620 IF CODE x$=110 THEN  LET m=
-1
8621 IF CODE x$=115 THEN  LET m=
1
8622 IF CODE x$=101 THEN  LET n=
1
8623 IF CODE x$=119 THEN  LET n=
-1
8624 IF f=2 AND CODE x$=120 THEN
  RETURN
8625 IF (m=0 AND n=0) OR a+m<1 O
R a+m>21 OR b+n<1 OR b+n>17 THEN
  BEEP .5,.5: GO TO 8617
8627 LET b=b+n: LET a=a+m: IF f=
2 THEN  RETURN
8630 IF a(b,a)=0 THEN  LET 1=1+.
04-(t-1492)/1000: PRINT AT a,b;y
$: PRINT AT a-m,b-n; PAPER 5; IN
K 7;"A": GO TO 8660
8635 LET 11=11+.25: GO SUB 8410:
 PRINT AT 19,19;"(9*sp)";AT 20,1
9;"Land ahoy!";AT 21,19;"(3*sp)"
: IF a(b,a)>7 THEN  GO TO 8655
8636 LET w$=STR$ b: IF LEN w$=1
THEN  LET w$="0"+w$
8637 LET z$=STR$ a: IF LEN z$=1
THEN  LET z$="0"+z$
8640 LET d=b(q,7): IF k=13 THEN
 LET b(q,20)=b(q,20)+INT (b(q,21
)*.9): LET x=b(q,20): LET mm=m:
LET m=4: INK 7: PAPER 4: GO SUB
20: LET b(q,21)=0: PAPER 6: LET
m=6: LET x=0: GO SUB 20: GO SUB
15: LET m=mm
8642 IF a(b,a)>0 THEN  LET c$(q)
=c$(q, TO d)+w$+z$
8644 LET d=b(q,10): IF a(b,a)=4
OR a(b,a)=3 THEN  LET b(q,10)=d+
1: IF a(b,a)=3 THEN  LET b(q,10)
=d: LET b(q,11)=b(q,11)+1
8645 GO SUB 50: IF a(b,a)>0 THEN
  LET a(b,a)=c+10*q: LET b(q,7)=
b(q,7)+4
8650 IF f=2 OR f=3 THEN  RETURN
8655 LET a=a-m: LET b=b-n
8657 IF 11>RND THEN  PRINT AT 18
,19;"Ships return": PAUSE h: PRI
NT AT a,b; PAPER 5; INK 7;"A": R
ETURN
8660 IF 1>RND AND b(q,13)>1 THEN
  LET b(q,13)=b(q,13)-1: PRINT A
T 18,19;"Ship lost": PAUSE h: PA
USE h: PRINT AT 18,19;"(9*sp)"
8665 IF 1>RND AND b(q,13)=1 THEN
  LET 11=2: GO TO 8657
8670 GO TO 8615
8700 IF k=17 AND b(q,7)=0 THEN
RETURN
8702 IF k=14 AND b(q,9)=0 THEN
RETURN
8703 INPUT "Which force (1-3) or
 0 ? ";x$
8704 LET n=3: GO SUB 40: LET z=V
AL x$: IF z=0 THEN  NEXT k
8705 IF b(q,27+5*z)>b(q,k)*50 TH
EN  LET b(q,27+5*z)=b(q,k)*50
8715 FOR x=1 TO 21: PRINT AT x,0
; INK 1;CHR$ (x+96): NEXT x
8720 INPUT "Which row ? (a-u) ":
x$
8725 IF CODE x$<97 OR CODE x$>11
7 THEN  BEEP .5,.5: GO SUB 25: G
O TO 8720
8730 FOR x=1 TO 17: PRINT AT 0,x
; INK 1;CHR$ (x+96): NEXT x
8735 INPUT "Which column (a-q) ?
";y$
8740 IF CODE y$<97 OR CODE y$>11
3 THEN  BEEP .5,.5: GO SUB 25: G
O TO 8730
8745 LET b=CODE y$-96: LET a=COD
E x$-96
8747 IF a(b,a)=0 THEN  PRINT AT
18,19;"That's sea!";AT 19,19;"Tr
y again.": GO TO 8720
8750 IF a+1<=21 THEN  IF a(b,a+1
)=0 THEN  GO TO 8760
8751 IF a-1>=1 THEN  IF a(b,a-1)
=0 THEN  GO TO 8760
8752 IF b+1<18 THEN  IF a(b+1,a)
=0 THEN  GO TO 8760
8753 IF b-1>0 THEN  IF a(b-1,a)=
0 THEN  GO TO 8760
8755 PRINT AT 18,19;"There is no
";AT 19,19;"sea route.": GO TO 8
720
8760 GO SUB 65: IF k=17 AND c<>q
 THEN  PRINT AT 18,19;"Not a col
ony.": GO TO 8720
8765 IF k=14 AND c<>b(q,9) THEN
 PRINT AT 18,19;"Not an enemy.":
 GO TO 8720
8780 LET b(q,25+5*z)=a: LET b(q,
26+5*z)=b: LET b(q,28+5*z)=0: PR
INT AT a,b;"C": IF k=14 THEN  LE
T b(q,28+5*z)=-1
8790 RETURN
8800 LET f=0: GO SUB 7: LET v=(b
(w,x)*b(w,25)+1)/(b(y,z)*b(y,25)
+1)*(1+RND/2-RND/2)
8810 IF v<1 THEN  PRINT AT m,2;"
attacker defeated": LET b(w,x)=I
NT (b(w,x)-2*b(y,z)/v)
8815 IF v>=1 THEN  LET f=1: PRIN
T AT m,2;"defender defeated": LE
T b(y,z)=INT (b(y,z)-v/2*b(w,x))
8820 IF b(w,x)<=0 THEN  LET b(w,
x)=0
8822 IF b(y,z)<=0 THEN  LET b(y,
z)=0
8825 RETURN
8845 LET w=a: LET x=b
8847 IF b(q,9)=0 THEN  RETURN
8848 GO TO 8851
8850 LET g=0: LET w=b(k,25+5*y):
 LET x=b(k,26+5*y)
8852 IF w=0 THEN  RETURN
8855 LET u=0: FOR 1=1 TO 3: LET
co=0: LET o=b(r,25+5*1): LET u=b
(r,26+1*5)
8860 IF w=o AND x=u THEN  LET co
=1
8862 IF g=1 AND co=1 THEN  LET 1
=3: NEXT 1: LET g=2: RETURN
8863 IF co=1 THEN  GO SUB 8870
8865 NEXT 1: IF co=0 AND INT (a(
x,w)/10)=k THEN  RETURN
8868 IF co=0 THEN  LET f=3: GO T
O 8882
8870 PRINT AT m,0;"- land battle
": LET v=(b(k,27+5*y)+1)/(b(r,27
+5*1)+1)*(RND/2-RND/2+1)
8875 IF v>1 THEN  PRINT AT m,17;
"attacker wins": GO SUB 7: LET b
(r,27+5*1)=INT (b(r,27+5*1)-(v/2
*b(k,27+5*y))): LET f=3: IF b(r,
27+5*1)<=0 THEN  FOR z=1 TO 4: L
ET b(r,24+z+5*1)=0: NEXT z
8880 IF v<=1 THEN  PRINT AT m,17
;"defender wins": GO SUB 7: LET
b(k,27+5*y)=INT (b(k,27+5*y)-(2/
v*b(r,27+5*1))): LET f=2: IF b(k
,27+5*y)<=0 THEN  FOR z=1 TO 4:
LET b(k,24+z+5*y)=0: NEXT z
8882 LET a=w: LET b=x: IF f=2 TH
EN  LET q=r
8883 IF f=3 THEN  LET q=k
8884 IF INT (a(b,a)/10)<>q THEN
 GO SUB 8636
8885 IF q=r THEN  LET v=k: GO TO
 8887
8886 IF q=k THEN  LET v=r
8887 LET z=1: IF CODE c$(v,1)=32
 THEN  LET b(v,7)=0: LET b(v,8)=
0: RETURN
8888 IF VAL c$(v,1 TO 2)=b AND V
AL c$(v,3 TO 4)=a THEN  LET c$(v
,1 TO )=c$(v,z+4 TO b(v,7)): GO
TO 8892
8890 IF VAL c$(v,z TO z+1)=b AND
 VAL c$(v,z+2 TO z+3)=a THEN  LE
T c$(v,1 TO )=c$(v,1 TO z-1)+c$(
v,z+4 TO b(v,7))
8892 IF CODE c$(v,z+4)<>32 THEN
 LET z=z+4: GO TO 8890
8893 LET b(v,7)=b(v,7)-4: GO SUB
 50: LET ti=b(v,10): IF c=4 OR c
=3 THEN  LET b(v,10)=ti-1: IF c=
3 THEN  LET b(v,10)=ti: LET b(v,
11)=b(v,11)-1
8897 RETURN
8900 IF a(x,y)=5 AND RND>.5 THEN
  LET a(x,y)=4
8910 IF a(x,y)=5 AND RND>.4 THEN
  LET a(x,y)=6
8915 IF a(x,y)=5 THEN  LET a(x,y
)=3
8920 RETURN
9100 LET f=0: LET e=.75
9101 LET a=.5*e: LET b=.25*e: LE
T c=.375*e: LET d=.125*e
9105 BEEP b,9: BEEP a,12: BEEP b
,14: BEEP c,16: BEEP d,17: BEEP
b,16: BEEP a,14: BEEP b,11: BEEP
 c,7: BEEP d,9: BEEP b,11: LET f
=f+1: IF f=2 THEN  GO TO 9112
9107 BEEP a,12: BEEP b,9: BEEP c
,9: BEEP d,8: BEEP b,9: BEEP a,1
1: BEEP b,8: BEEP a,4: IF f=3 TH
EN  GO TO 9115
9110 IF f=1 THEN  GO TO 9105
9112 BEEP c,12: BEEP d,11: BEEP
b,9: BEEP c,8: BEEP d,6: BEEP b,
8: BEEP (a+b),9: BEEP b,9: PAUSE
 (b*50)
9115 BEEP (a+b),19: BEEP c,19: B
EEP d,18: BEEP b,16: BEEP a,14:
BEEP b,11: BEEP c,7: BEEP d,9: B
EEP b,11: LET f=f+1
9117 IF f=3 THEN  GO TO 9107
9125 BEEP c,12: BEEP d,11: BEEP
b,9: BEEP c,8: BEEP d,6: BEEP b,
8: BEEP (a+b),9: BEEP a,9
9130 RETURN
```



GHASTLY GONZO



Arch-criminal Gonzo has busted out of jail and is after your gold. The only way to stop him, according to Michael Cronin of Northampton, is to drop rocks on his head.

Whether or not you can think of more desirable methods of dealing with burglars, **Ghastly Gonzo** runs on the ZX-81 in 16K, and demonstrates how clever use of the character set in Inverse mode can juice up a game's graphics considerably.

```
   2 GOSUB 360
   5 LET RAND=INT (RND*25)+1
  10 LET SC=0
  11 LET F=0
  12 LET HIT=0
  30 LET HI=0
  31 LET LIFES=2
  40 LET X=5
  50 LET Y=2
  55 LET G=0
  60 REM MICHAEL CRONIN
  70 FOR N=0 TO 21
  80 PRINT AT N,0;"                                "
  90 NEXT N
  91 FOR A=0 TO 80
  92 PRINT AT INT (RND*21),INT (RND*31);" "
  93 NEXT A
 100 PRINT AT 21,0;"                                ";AT 20,0;"                                "
 105 PRINT AT 19,0;"                                ";AT 18,0;"                                "
 110 PRINT AT 2,29;"                                "
 111 PRINT AT 2,RAND;"    "
 112 PRINT AT 0,0;"                                "
 120 FOR N=4 TO 28 STEP 6
 121 PRINT AT 2,RAND;"    "
 130 PRINT AT 17,N-1;"   ";AT 16,N-1;"   ";AT 15,N;"O"
 140 PRINT AT X,Y;" "" "
 150 LET Y=Y+(INKEY$="8")-(INKEY$="5")
 160 PRINT AT X,Y;" "" "
 170 IF INKEY$="0" THEN LET G=100
 180 IF G=100 THEN FOR F=6 TO 15
 190 IF G=100 THEN PRINT AT F,Y+1;" ";AT F,Y+1;" "
 194 IF G=100 THEN NEXT F
 195 IF RAND=Y THEN LET SC=SC-100
 200 LET DOPE=INT (RND*7)
 201 IF DOPE=1 THEN PRINT AT X,Y;"   "
 202 IF DOPE=1 THEN LET Y=Y-2 AND Y<>0
 203 IF DOPE=5 THEN PRINT AT X,Y;"   "
 204 IF DOPE=5 THEN LET Y=Y+2 AND Y<>29
 210 IF F=16 AND Y+1=N THEN LET HIT=1000
 220 IF HIT=1000 THEN PRINT AT 10,5;"HIT"
 230 IF HIT=1000 THEN PAUSE 100
 240 IF HIT=1000 THEN PRINT AT 10,5;"   "
 241 IF HIT=1000 THEN LET SC=SC+50
 242 IF HIT=1000 THEN LET LIFES=LIFES+1
 249 LET F=0
 250 LET HIT=0
 251 IF LIFES=0 THEN GOTO 300
 252 IF G=100 AND HIT<>1000 THEN LET LIFES=LIFES-1
 255 PRINT AT 17,N-1;"   ";AT 16,N-1;"   ";AT 15,N;" "
 256 PRINT AT 2,RAND;"    "
 260 LET HIT=0
 270 LET G=0
 280 NEXT N
 290 GOTO 120
 300 IF HI<SC THEN LET HI=SC
 310 PRINT AT 10,3;"SCORE=";SC;"      HI=";HI
 311 PRINT AT 5,5;"GAME OVER"
 320 LET SC=0
 321 LET LIFES=2
 330 PAUSE 200
 340 CLS
 350 GOTO 70
 360 FOR F=0 TO 21
 370 PRINT AT F,0;"                                "
 380 NEXT F
 390 PRINT AT 2,4;"PRESS A KEY FOR"
 400 PRINT AT 5,5;"                    "
 410 PRINT AT 6,5;"                    "
 420 PRINT AT 7,5;"                    "
 430 PRINT AT 8,5;"                    "
 440 PRINT AT 9,5;"                    "
 450 PRINT AT 10,5;"                    "
 460 PRINT AT 11,5;"                    "
 470 PRINT AT 2,4;"PRESS A KEY FOR"
 480 PRINT AT 5,5;"                    "
 490 PRINT AT 6,5;"                    "
 500 PRINT AT 7,5;"                    "
 510 PRINT AT 8,5;"                    "
 520 PRINT AT 9,5;"                    "
 530 PRINT AT 10,5;"                    "
 540 PRINT AT 11,5;"                    "
 650 IF INKEY$="" THEN GOTO 390
 660 FOR R=0 TO 21
 670 SCROLL
 680 PRINT AT 21,0;"                                "
 690 NEXT R
 700 PRINT AT 0,5;"ASTRO ATTACK"
 710 PRINT AT 2,0;"THE DREADED GONZO HAS ESCAPED ";AT 4,0;"FROM PRISON AND IS STEALING YOUR";AT 6,0;"GOLD THERE IS ONLY ONE WAY";AT 8,0;"TO STOP HIM THAT IS TO";AT 10,0;"DROP A ROCK ON HIS HEAD";AT 12,0;"USING KEYS 5-LEFT 8-RIGHT";AT 14,0;"0-TO DROP A ROCK"
 720 PRINT AT 16,0;"YOUR MISSION IS TO STOP GONZO"
 730 PRINT AT 18,3;"PRESS A KEY TO PLAY"
 740 FOR T=0 TO 25
 750 IF INKEY$<>"" THEN RETURN
 760 NEXT T
 770 PRINT AT 18,3;"PRESS A KEY TO PLAY"
 771 PRINT AT 20,0;"YOU HAVE TWO LIVES YOU GET 50  POINTS PER HIT"
 780 GOTO 730
```



Illustration: Graham Ward

Escape from the modern world

Richard Price looks at some contemporary adventures

WHEN YOU are on the hunt for a new adventure what is it you are looking for?

You will naturally expect the game to have playability — that combination of technical factors most of us take for granted when we buy commercial programs. You have a right to demand a decent vocabulary, good response time and a flexible interpreter which comes across with some sort of personality during play. You will assume the writers have devised carefully designed puzzles set into a coherent structure.

Those are the requirements of any good game but it is fair to say that an adventure's success and the satisfaction it gives you will be decided mainly by the quality of its plot and the atmosphere it generates.

All of us want an escape into other worlds at times to savour the pleasure of being someone or somewhere else. That fantasy is the core of the appeal of computer adventure. Fantasy, though, is fragile and, whether you prefer herioc, modern or futuristic scenarios, the setting you make your journey in must hold your belief right to the end.

Quite often people will say that fantasy works by suspending your disbelief. Tolkein himself did not think that was a convincing explanation of the way the mind handles fantasy. In *Tree and Leaf,* his short work about fairy stories, he put forward the idea that the writer — or games designer in our case — creates a 'secondary' world which your mind can enter. Once inside it you believe the general setting, the characters and action are true — meaning that they all obey the proper laws of their own world. The spell held over you may well be broken by some jarring intrusion from the real world or simply because the characters behave in a way that is out of kilter with the logic of their surroundings.

Far too many programs feature plots which, for instance, ask you to rescue a princess, find the scattered bits of some talisman or simply slash your way through a monster-infested cave riddled with rising damp and littered with treasures which no sorcerer in his right mind would leave lying around.

You may not be too happy to be regularly cast as a Conan-clone whose fist is bigger than his brain. That must be desperately aggravating for female adventurers who are expected to undergo a mental sex-change before powering up their Spectrums. If software companies are going to survive then they had better start looking for games which will appeal to a much wider public than is currently the case.

To be fair, there is a growing variety of styles and plots in the adventure genre but games that use real story lines are still pretty thin on the ground. The concept of bookware, though, seems to be taking off. Creating computer implementations of successful stories has some obvious advantages as the books have already proved that their 'secondary' worlds can hold people's attention and imagination. It still does not mean that the program will necessarily match up to the excitement or invention of the original but if the programmers are sensitive about the adaptation there is a chance of a good fit. Of course, the memory size of home micros also imposes rigid boundaries and limitations.

If you are an amateur programmer searching for a theme there is nothing to stop you turning your favourite pulp fiction into an adventure for home consumption.

If you are bored with magic and monsters history can provide equally exciting themes. Your heroine or hero could attempt to infiltrate the lair of the Old Man of the Mountains, the original master of the feared Assassins at the time of the Crusades. Deserts, strange nomads, wild mountains and grim fortresses guarded by fanatical killers all have their place in this adventure.

There are some programs which meet all or most of the criteria for successful secondary worlds and yet mirror the preoccupations and paranoias of our own times. They reflect different angles of life and often carry some sharp social comment.

Urban Upstart from Richard Shepherd Software depicts the grim emptiness of inner-city life. Imagine any decaying ex-industrial town in Britain and you will have an idea of what it is like to live in Scarthorpe. No jobs, no money, nothing to do. No one will wander the streets. Thuggish skinheads and paranoid police rule here.

You must comb the town and find the means to escape. Your own character is pretty suspect and not above theft and fraud to raise much-needed cash. The mean streets are depicted in location graphics but the format is traditional text adventure and tricky at that.

The game may not seem like escapism and it is not difficult to recognise parallels with Cut Throat Alley or Grime Street. Definitely a slice of social realism with a gritty, dangerous, feel to it, though not without flashes of humour.

If you are one of those gamesters who thinks adventures written on the Quill cannot match the real thing then **Hampstead** could provide a cure for your scepticism. The technical presentation may be defined by the utility but the subject matter and approach is new and genuinely funny.

There you are, stuck in your nasty smelly flat somewhere in the wilderness of north-west London, parked in front of *3-2-1* on the telly. The only way is up — so you think — and you nip out in search of the dole office to get your giro. Outside the back yard, gleaming in the sunlight, is a sign pointing to Hampstead. Nothing can stop you now, so you cross your personal Jordan and pedal towards the Promised Land only to find you cannot attain Hampstead simply by going there. You will have to change your style and your gear, read the right books and do the right things with the right people.

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At the sign of THE DANCING OGRE



Up here on the Enkash Moors winter comes early and the wolves have been howling around the fence these last few weeks. The Dancing Ogre *is in a lonely spot but the southern caravan route passes close by and a steady trickle of travellers and adventurers will overnight here — especially in this cold season when the nights are long and the beasts of the wilderness grow leaner and hungrier. The tap room is full of talk and argument and I hear tall tales that get taller by the minute after a few cups of Krean wine.*

Time after time I meet those who have travelled without success in the icy wastes of **Valhalla,** *the afterworld of the northern barbarians. A map in my possession may help Sheila from the township of Cambridge — she seeks Drapnir the ring of power. There are Pits in Hel and if she journeys east from there to a cave she will be able to jump to another part of Hel. North of here lies Despair. North once more will bring her to the ring.*

Another lady, known only to me as Byford the Fair, has faced similar problems in that chill place; let us hope she finds solace in this news. Few women pass by the tavern — more's the shame. I would like to know why they go adventuring and how they fare in a trade dominated by men. More power to their sword arms!

Deep in his ale one night, Robert the Nailer, from Devizes Town, confessed he had been searching for the fabled land of **Hampstead** *over many weeks. Though he had boarded a train and met a trader in antiques caller Perrier, he could get no further and was spurned by this odd creature.*

In my youth — before I worked as a mercenary for Prince Janga in Maru — I visited the place myself. Set in a maze, amongst the filth and fumes of orcish factories, there is a great treasure. Perrier will be eager to buy this artifact. Robert should thus find his way open, though final success will still be a long way off. To find the secret of the maze he will have to drop his belongings one by one and make a map, for the place is small but tricky.

My thanks to Mark Talbot, an initiate of great skill from the temple of Surclaif at Loughborough. He has sent me the map to Scarthorpe, that forbidden city of despair. Other students of **Urban Upstart** *should take note — if you do not carry a book on the art of flying with you you will never escape from this dismal place of ruins. The key will also be necessary.*

Philip James of North Wales has been examining the intricate and secret codes contained in **System 15000.** *He has found a number attached to the name 'KP Codes' but can't grasp its significance. It is easy to become lost in this strange ritual but it is always wise to return to earlier contacts. If Philip uses this number at Kingsdown he'll discover much to his advantage. Also if you wish to get information from Selcra you must always place a message on the board first — enter 'Selcra' followed by the name of the organisation.*

There are still those who brave the Third Continent on the trail of the **Black Crystal.** *Hammerfist Pelaez from London dropped in not two moons ago, tired from his struggles in the Shoggoth's lair. Although he was refreshed by a side of bacon and a stoup of mead I was unable to help him more. He seeks the location of the Shoggoth's treasure chamber and the way out from its prison.*

If you pass by the **Ogre** *come in and talk with me — perhaps you have some advice to give him. Whether you need aid or can give it you're welcome up here on the Moors. Safe journey to you all.*

Gordo Greatbelly, Landlord.

If you have a tale to tell, or are in need of a helping hand, write to the Landlord of the Dancing Ogre c/o Sinclair User, *67 Clerkenwell Road, London EC1R 5BH.*

continued from page 123

Not being totally stupid you will lie, cheat, even steal to get to this Nirvana of NW10 but you must avoid violence at all costs. The game is not merely about finding the right objects — it is also about attitudes as you must work out ways of making the correct deals. The answers are devious.

This is good situation comedy from Melbourne House and the game is attractively presented with a hilarious handbook. It is arguably one of the best Quilled adventures to date.

From this comfortable tweedy fantasy we descend into a shifting, threatening underworld of conspiracy, espionage and fear. A series of audio messages are recorded on your answering machine. Their growing urgency and the sound of a final shot leave you in no doubt — **Valkyrie 17** is active again, a cell of neo-Nazis whose deadly tentacles stretch around the world.

Thanks to the dying gasps of your agent you know their ruthless leader is holed up in an exclusive Austrian skiing resort at the Glitz Hotel. Your job is to seek him out and neutralise him. Take care; one foolish move and you will find yourself face down in the snow rapidly becoming a member of the great majority.

The level of paranoia is pumped up by ringing phones which, if answered, threaten you and make it clear that your cover is already broken. Everything a good thriller needs is here — locked safes, half-overheard conversations, blood on the crisp snow of the piste.

Valkyrie 17 is produced by the Ram Jam Corporation, a new outfit, and features detailed atmospheric descriptions. The location graphics are interactive and will change to show the results of significant actions. No help is given and you are absolutely on your own in a race against danger.

Isolation and danger are also the major themes of **System 15000** from AVS. This is no standard text adventure but it is definitely one of the most gripping and compulsive Spectrum games so far. A brief note informs you that Comdata Company has been ripped off for a cool million or more bucks in a computerised bank fraud. Lurking behind the heist are the mob, ominous and menacing. Your single lead is one phone number.

On loading you will find only the user screen of the 15000 network and the basic instructions on how to operate it. From that beginning you must penetrate the files of the other computers which use the net to uncover the twisting threads of the plot. The giant mainframes of the international banks are well protected against intruders and police data protection squads will shut the system down temporarily once they get a sniff of what you are up to. Stay cool and keep dialling — piece by piece you will edge your way towards the truth and attempt to restore the Comdata lost millions.

Your only input routines are phone numbers and an occasional cryptic note on the message board. There is no need to take on any role — this is you against the network in the here and now, deep in the loneliness of the long-distance hacker.

After hours of tracing leads you will find yourself cheering in triumph as you enter the files of the Reserve Manhattan Bank with its glittering stars and stipes logo or you will curse in frustration as yet another faceless machine informs you that your data is bad. You will begin to sense the network as very real, a vast jigsaw of numers, names and details. **System 15000** is utterly absorbing and compelling and recalls the atmosphere of the BBC series *Bird of Prey*. Absolutely recommended.


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Easy on Basics

THE REALLY Easy Guide To Home Computing, by Sue Beasley and Ruth Clark, adopts the discovery led method of learning. There are lots of cartoons and funnies interspersed throughout the text to aid the user, based on the characters of Mike and Rose and Inspector Key. Those characters at times can be a little overwhimsical which, in a way, detracts from the text.

It has to be asked, however, whether yet another book on learning Basic is necessary. Learning Basic at all is considered in some quarters to be inferior to learning Logo as a first programming language at nine plus. As *The Really Easy Guide to Home Computing* is aimed at that age-group, it would seem that it could be superfluous on two counts. *Theo Wood*

THE REALLY EASY GUIDE TO HOME COMPUTING: THE ZX SPECTRUM
Century Publishing
Price: **£6.95**

Case of the Pascal puzzle

THE INFLUX of different versions of Pascal for the Spectrum and QL has certainly made the language more popular with microcomputer enthusiasts and a good book on the subject is essential. Surprisingly enough, one of the best books was written two years ago and creates a novel approach to the language.

Elementary Pascal, by Henry Ledgard and Andrew Singer, may seem an uninspired title for a book but the sub-title, Teach Yourself Pascal by solving the mysteries of Sherlock Holmes, gives some clue as to the tack that the authors follow.

After a brief preface in which an old manuscript containing some forgotten notes, written by that eminent GP Dr Watson, are discovered, the book launches into the first escapade involving Sherlock Holmes. He discovers the Analytical Engine, which we would call a computer, and shows Watson how it can be used by a criminologist to collate facts and render clues more helpful.

Holmes does not see it as a miracle machine which can solve cases but as something that will be useful in proving that his conclusions are correct. "Of most interest to me is that it will provide a way of expressing my logical methods in a rigorous form, and perhaps be useful in communicating to others my modest attempts at formulating a Science of Deduction".

Indeed it does. The explanations given by Holmes, followed by the notes of the authors, combine to produce an excellent, stimulating and amusing text which provides at least a basic grounding in the main Pascal sub-set common to all versions of the language.

The main section of the book is used by Watson to discuss four cases in which Holmes used the Analytical Engine. The first, Murder at the Metropolitan Club, deals with algorithms and shows how ideas for programs can be written down in the systematic way required by the Pascal programming language. Holmes finds the murderer by fitting clues together within a computer environment and then looping around the program instructions until one clue fits with another and the villain is found.

The remaining cases build on the knowledge of Pascal that the first gives. In the Adventure of the Bathing Machine, Holmes enters data about sea tides in order to find the time of a murder and trap a murderer; A Study in Cigar Ash shows how Holmes teaches Watson how to enter data into the Analytical Engine using Pascal and how that information can be accessed; and finally, The Adventure of Clergyman Peter finds Holmes trapping a religious thief with the aid of a train time table and the Analytical Engine.

Once the main body of the Pascal language has been introduced Holmes indulges in a series of three pipe problems. Those are simple cases which show how useful application programs can be written in Pascal. The programs grow more complex but the real authors of the book continue the notes with which they back up all of Holmes' cases. Those notes seem to be for people who have not followed the famous detective's thinking.

Despite its unorthodox approach, *Elementary Pascal* should help even the most accident prone potential programmer learn the language which is growing more popular all the time. The book's style is somewhat similar to that of Conan Doyle and Holmes is a reasonable counterfeit. *John Gilbert*

ELEMENTARY PASCAL
Fontana
Price: **£4.95**

more books on page 133

Taking the QL to task

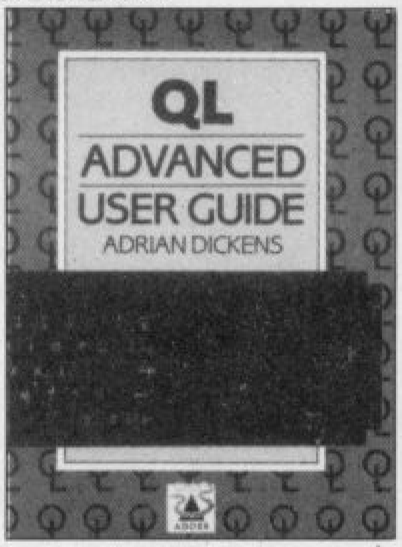
FEW PUBLISHERS have ever considered launching books about machine code on the QL or how to get the most from QDOS. While some have been capitalising on the power of the SuperBasic language others have just been worried whether the operating system will change or about how to treat the information.

Neither of these worries has hit Adder Publishing which has just launched *The Advanced QL User Guide* by Adrian Dickens. It contains just about everything that both software houses and the private individual require to launch into machine code programming.

When taking the first steps towards QDOS mastery the reader is introduced to a SuperBasic program called the Experimenter which will allow many of the 68008 registers to be changed. It also allows the beginner to see the results of QDOS routines, and how they will affect the running of the QL. Dickens suggests several experiments including suspending the operation of SuperBasic and printing a character on the screen.

The Experimenter is limited in its appeal but the author soon progresses into machine code manipulation of QDOS, giving a full list of QDOS utilities available and the traps required to invoke them.

Despite the sometimes convoluted style and the exorbitant price, *The Advanced QL User Guide* acts as an



excellent reference book as well as a tutorial. It is a stepping stone into the heart of the QL.

John Gilbert

THE ADVANCED QL USER GUIDE
Adder Publishing
Price: **£12.95**

Advice for hopeful software superstars

ANYONE caught giving away the trade secrets of an industry would normally be regarded with suspicion by co-workers in that field. The culprit in this case, A J Harding with his book *Writing Software For Profit,* is, however, likely to be blessed by colleagues in the software industry and amateur programmers who want to get their ideas into the shops.

The book, published by Virgin Books, not only shows how to approach the business side of the operation — going to software houses, writing specific application programs and dealing with income tax — but also describes the ideas behind the industry, which types of programs are likely to be accepted and how to go about writing them.

The advice given is that of a software publisher as Harding knows the business inside out. He has been in it six years as director of a software house.

The first section of the book describes the industry, how it has grown and the type of people who are involved in it. It covers mostly the upper, business, end of the market but the innovations shown by Tandy and Commodore are equally true of the smaller outfits attached to the home market.

Harding explains that professional authors write for chips and not for specific machines. In that way one program can be adapted for a wide variety of micros which contain the same chip. For instance, a game written for the 6502 could be easily run on the BBC Micro and the Commodore range of machines. A Z80 game could be transported across a wide variety of machines including Spectrum and Colour Genie.

The next section, choosing a subject, expands on the theme of machine popularity. Harding lists the types of programs which companies will accept and stresses that you should pick companies carefully.

Programs on the list include arcade, adventure, board, utility and simple account software. Each category has a section to itself in which the author explains the area and the pitfalls involved in it. He defines an adventure as a puzzle in which "certain actions have to be carried out in a chronological order". Harding goes on to explore some of the aspects which should be incorporated in adventures, such as syntax decoders, and how they have been used in famous programs such as those written by Scott Adams.

It is a change to find an author who talks about software writing as a business and not as an art form. His message is clear. Good software makes big bucks. Creativity is a consideration, but as in any other business money has to be a prime concern or you will be bankrupt before your first program has been accepted.

Harding's reasons for writing such a book, to help programmers get the most out of publishers when he runs such a company, might be regarded as suspect. The reverse is true, however, for two reasons. Publishers will welcome the book because it shows programmers what a company requires for a quick turnover of material. Gone will be the days of endless dross sent through the post on bad-quality tape or as listings.

For the programmer the book provides all the answers. It might deter some from writing software but those are likely to be the ones who demand attention for their masterpieces which are sent in as miles of computer printer listing. As the book says, computers mean business.

John Gilbert

WRITING SOFTWARE FOR PROFIT
Virgin Books
Price: **£4.95**

No experience required

WHEN the QL sales finally take off there will no doubt be people buying the machine who have no previous experience with computers. For that reason the two books *QL Quill* and *QL Easel* are a comprehensive guide to their operation.

QL Quill was written by Clare Spottiswoode and Francesca Simon. The former has had a great deal of experience with both mainframes and micros. Francesca Simon, as arts journalist for the *Sunday Times,* has expertise in writing for a non-computerate audience.

It is that combination which is responsible for the jargon-free nature of the book, which takes you step by step through the operation of Quill, the word processing program for the QL. The book is well laid out with ample explanation of each new concept. Besides that each new task is tied in to the story of Harold and Joyce Blake, their daughter Miranda, and her besotted admirer Nigel Wooton. Cartoons, from Derek Alder of the *Sunday Times* liven up the text. Whether you like or loath the family concerned, the tales of Harold, a soft toy manufacturer, and Joyce, setting up her jewellery business, provide adequate examples of the uses of Quill in a business.



The book not only teaches you how to use the program, but also contains a great deal of sound business advice. An example of that is Joyce's action plan for Jada Jewellery which contains all the necessary ingredients for preliminary action before starting a new trading venture.

One tiny quibble comes at the beginning, when you are warned "Don't ever plug in a monitor when the computer is switched on, or you could blow your system." That is not in bold characters but lost in the text which preambles setting up the computer.

There is also an error in the instructions for Search and Replace. If you follow the book the procedure does not work; simply follow the screen instructions instead.

QL Easel, written by Alison Spottiswoode, who is as well qualified as her sister in the micro field, is written in a similar vein. There are more examples based on Harold and Joyce. The power of the program is readily accessible, and by illustrating that power the author has made it extremely easy for the business user to understand the usefulness of graphic interpretations of business figures.

Theo Wood

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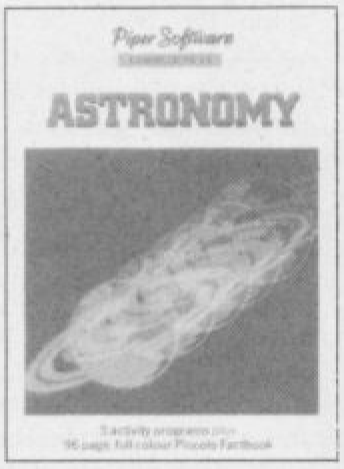
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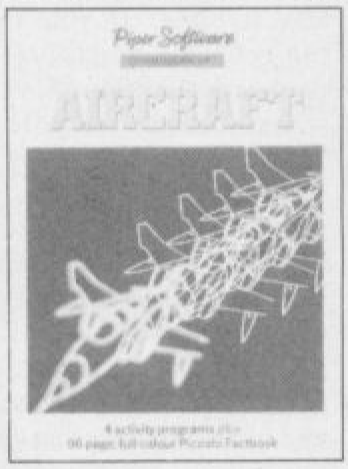
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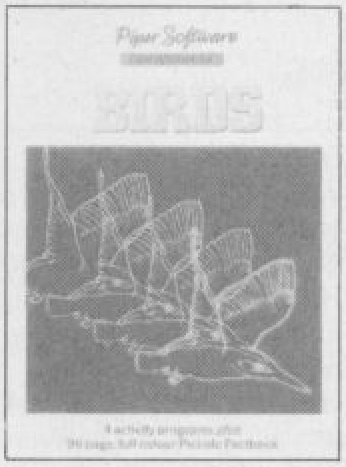
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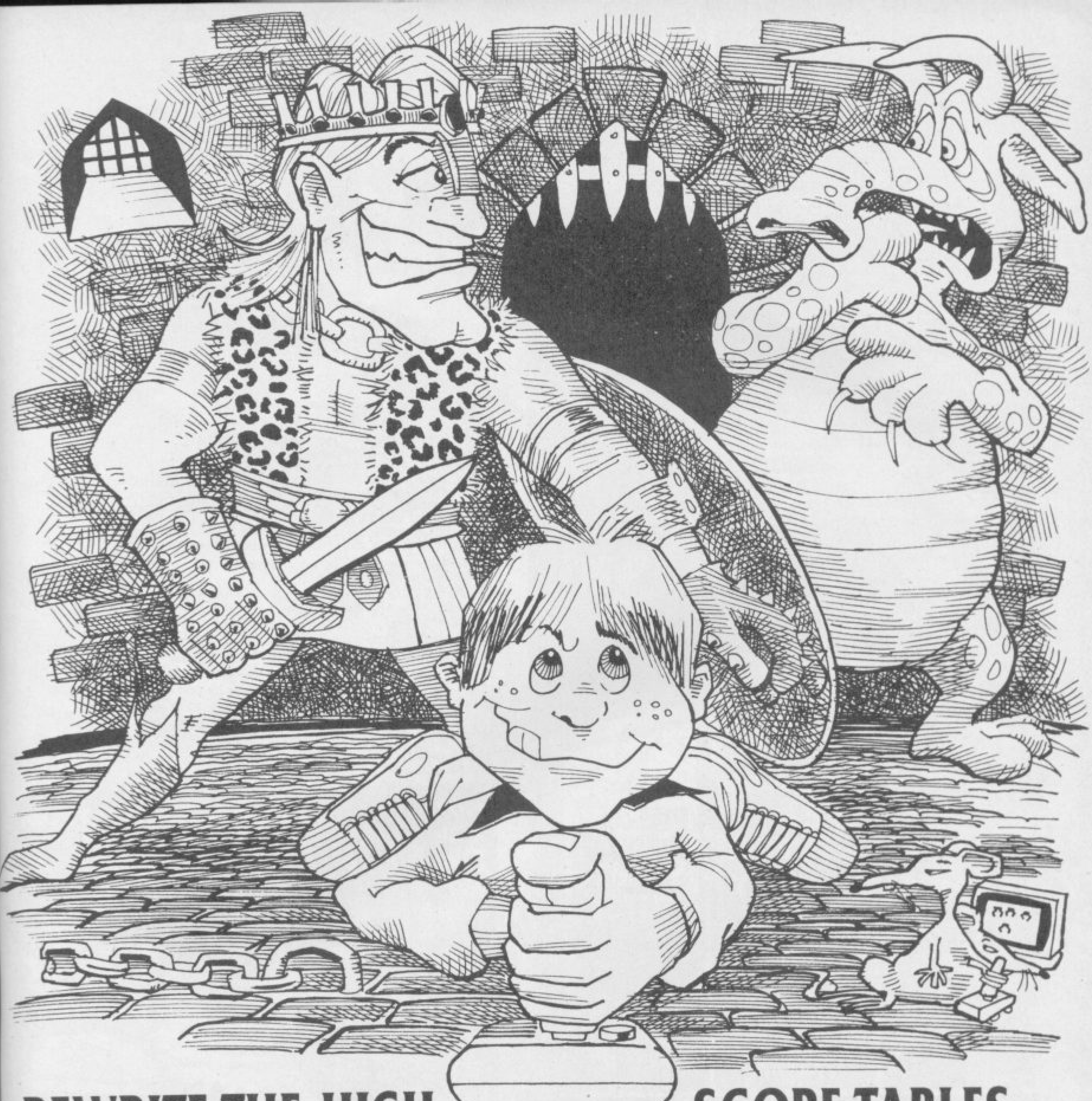
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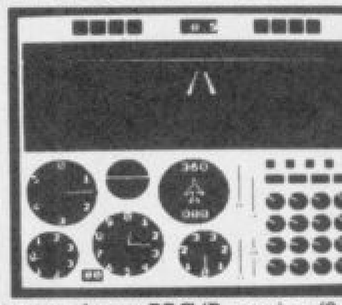
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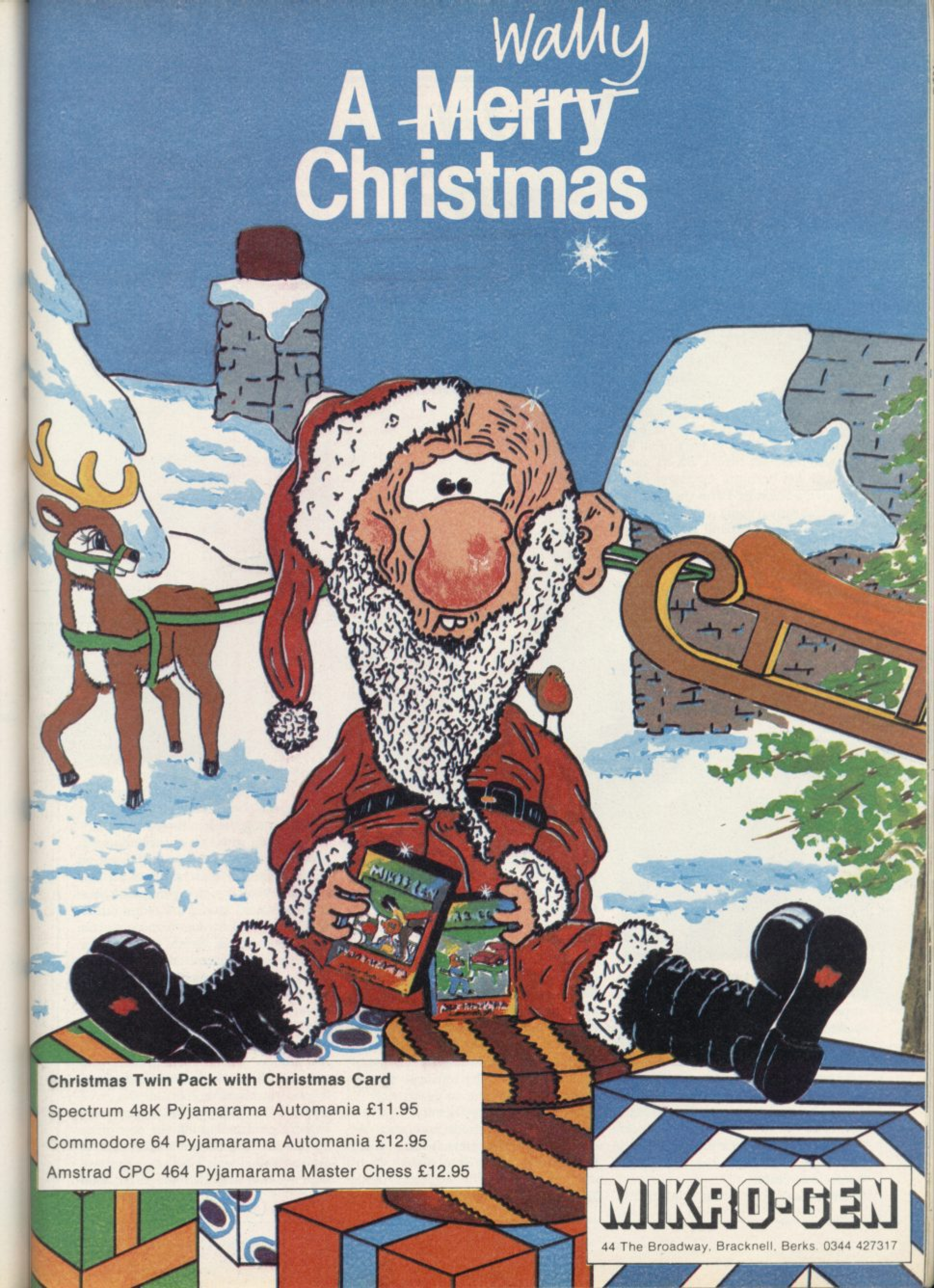
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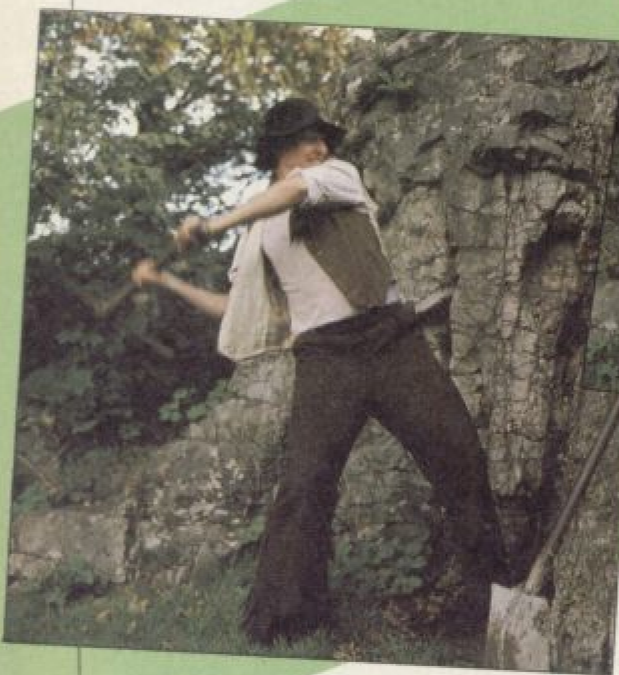

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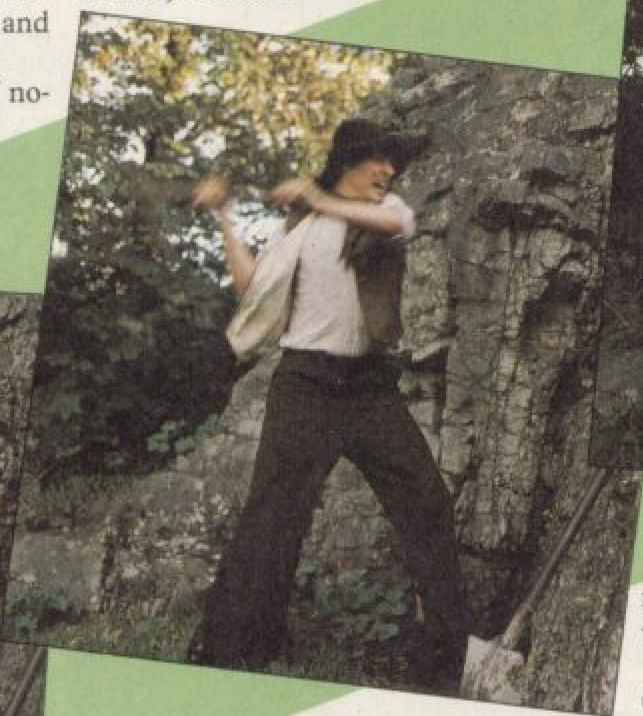
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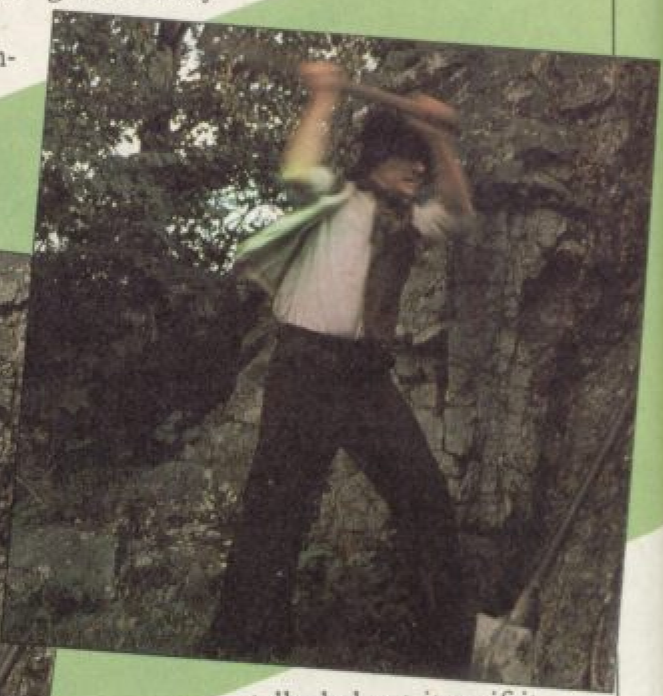
Chris Bourne digs into the past of ZX-81 specialist, Julian Chappell

MAKING a living out of the ZX-81 seems an odd thing to attempt in times when most software houses treat the machine as if it were carrying typhoid bacteria. Some retailers would prefer to see a rabid dog on their premises than a ZX-81 game. But such has been the success of Julian Chappell's Software Farm that not only is the company a going concern but it is even planning to expand into new and bigger offices.

Julian was born in Hounslow of nomadic parents in 1956. "My father was an oil depot manager, so we kept







moving to new depots. Eventually he retired to Weston-super-Mare and ran a sub-post office. I started work behind the counter when I was eighteen."

Julian had an older brother, Paul, who was an electronics graduate. Paul was setting up his own business constructing control devices for industrial processes. Julian was dragooned into learning machine-code programming in order to help write the routines to control the chips.

"Eventually we went high-falutin' and did a control system for the local nuclear power station. Unfortunately we couldn't throw it into critical to test the system. I don't know whether they used it in the end."

Before you heave a sigh of relief at the thought that nuclear devastation may after all not be under the control of the undoubtedly zany Julian, it is certainly true that a British Steel blast furnace is being monitored by bits of an old ZX-81, courtesy of the Chappell brothers.

"It provides a printout of the temperature," says Julian, "monitoring safety levels. Of course, it doesn't look like a ZX-81. We put it in a fancy box to make sure of that."

Machine-code expertise came haphazardly. "Paul would say, 'I've got this cheap chip we could bung in it' and half the time I had to hunt through the libraries for a list of mnemonics to program it. Sometimes there were only two registers and an accumulator."

Eventually the brothers fell out. "I wanted to do something on my own," Julian admits. "The business was unsteady, so I left him to go bust on his own. It was all very friendly."

Having drifted almost by chance into the world of micro-electronics, Julian had already acquired a ZX-81 of his own. "I was mildly interested in the ZX-80," he says, "but it was almost as crude as what I was doing myself at the time. Only nutcases had ZX-80s. When the '81 came out I thought I'd find out about this wonderful Basic language."

His first impression of wonderful Basic was that it was painfully slow, even when number-crunching. He wrote some games for it in code, a Pacman and Asteroids game, which were later marketed as **Asteroids** and **Gobblers.**

"I wrote them for fun. It was a busman's holiday really. Then I bought *Sinclair User* and saw that only about 10 per cent of the ads were for machine-code games. They talked about it as if it was something amazing and mysterious. I realised that I might as well jump on the bandwagon."

Together with his girlfriend Sarah Green, Julian took out a quarter-page ad in *Sinclair User* and began to sell his games. The two of them worked from a back bedroom, saving the games directly from the machine and doing the labels themselves. Sarah herself is far from being just a convenient envelope-licker, but a business programmer in her own right, having written for the Sirius, Apricot, "and IBM, yeuckk!"

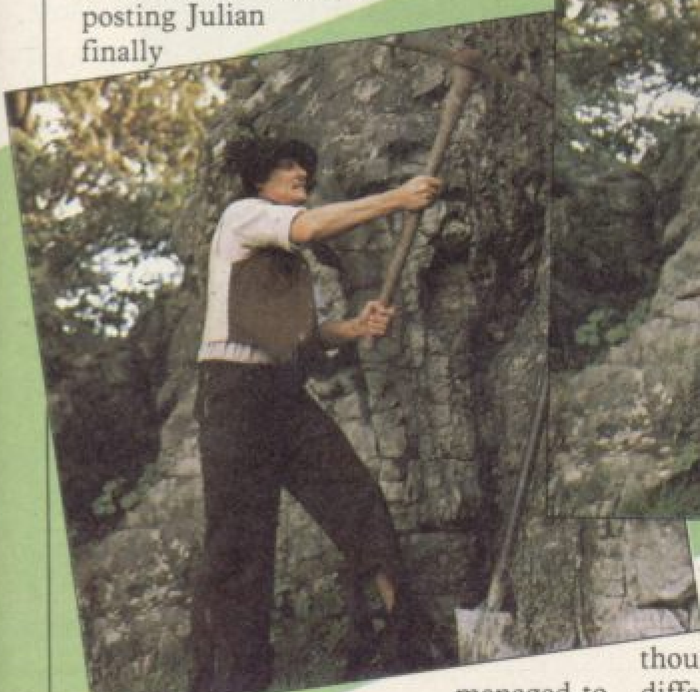
"The response kept us up at night," Julian continues, "and we started making money. The problem, which still exists, was that the business side interferes with programming time."

Thus the Software Farm was born. Julian's parents had left the post office by now and had bought a small farm in South Wales, which became the business address, as Julian and Sarah were living in rented accommodation and

could not use it commercially.

"We were aware of the general attitude of fear towards computers, particularly among older people, so we thought calling the company a farm might help them relate to us. Originally we had a vegetable Pacman but eventually we decided on the cosmic cockerel."

In between long bouts of duplicating and letter-posting Julian finally



managed to write a new program, **Super-Scramble.** Instead of the usual missiles and neutron bombs Julian used bats and a witch at the end.

"It has very imaginative graphics even though they are not hi-res," interjects Sarah, supportively. The game was released for Christmas 1982 but the manual duplicating was becoming a major problem.

"At that time all the support agencies were in their infancy," says Julian, "but then we started getting information through the post. It was a godsend to us, even though it was still tape-to-tape. Only now, and only with big companies, can you get loop bin duplication systems."

Julian and Sarah took Super-Scramble to the very first ZX-Microfair just in time to see Spectrum fever hit the trade.

"We were deserted," says Julian. "We sold enough to break even, but it was a great disappointment. We made no trade contacts. Everyone wanted Spectrum games, and that has continued ever since."

Being left out in the cold did, however, give Julian a different perspective on what was happening. "We could see everybody was going bonkers. The software was all rubbish, with ten new companies a day. It was blatantly obvious that the market was flooded from day one."

Eventually Software Farm decided what few software companies dared to consider: to remain with the ZX-81 in spite of the new machine.



"Although everyone was going stir-crazy, all those ZX-81s were not going to evaporate. We thought, let's do something clever and different with it. With any luck everybody else will leave us with the ZX-81 on our own."

For six months Software Farm lived off the dwindling profits from the original games, while Julian set himself to work out how to turn the ZX-81 screen into high resolution.

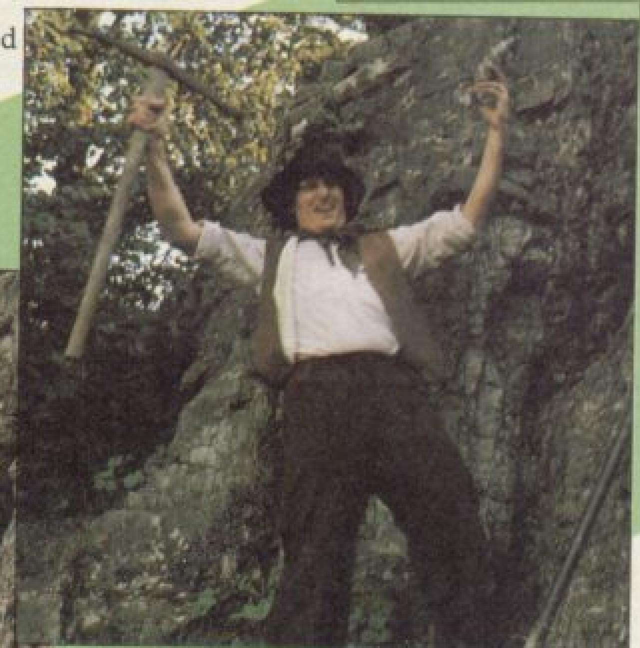
"It took six months to develop the system and three months to write the first program, **Forty Niner.** All the while the money was getting less. There was a sense of risk. If we had it wrong and the ZX-81s really were gathering dust then we would go bust."

The crunch came at the *Your Computer* Christmas Fair in 1983. At that time, the company was at rock-bottom. Forty Niner was launched, and took off. The gamble had worked.

Forty Niner was designed as a showpiece for the new graphics which give the same resolution as on the Spectrum. It is a digging game in which you must persuade the snakes to eat the giant rats or some such nonsense. Julian hit on the idea of projecting it as the first in a series of hi-res games, each one of which is to be on a distinct theme.

"It's like free wotsits in cornflakes packets," says Julian. "If you get one then you want the whole set."

The second game, **Rocket Man,** is a levels and ladders game in which you must collect diamonds while avoiding the man eating bubloid. If you get past



Photographs — Mike McKnight

the third level you become a vulture and must eat legs of lamb to keep your strength up.

Selling the games to retailers was difficult.

"You could hear the voice at the other end of the phone drop as soon as they realised it was a ZX-81 game" says Julian. "We had to offer them sale or return terms, but once the media was on our side it changed. Now they keep badgering us for more."

The new game will be called **Z-Xtricator,** and will be of the **Defender** type. "It's not a vehicle for the graphics, otherwise we would have done it first. We are also going to do a hi-res utility so people can design their own games."

Z-Xtricator is not intended to be the last in the Software Farm hi-res series, but one thing you should not expect is any form of adventure game. Julian hates them.

"Normal adventures bore me to tears. You are in a dark hole. Something ferocious is approaching. Then you wait for twenty minutes while nothing happens . . . On the other hand, I have a hankering for a truly animated adventure, not a pretend one. If we did it, it would probably have to be on the Spectrum. The Software Farm," he adds, portentiously, "being innovatory, will do it properly."

Sarah is anxious to dispel ideas that a Spectrum game would mean leaving the ZX-81. "Every letter we get says keep up the good work. We got one cute one which said the writer had written to *Jim'll Fix It* because he wanted to meet Julian."

Software Farm is certainly proud of its following. 'As long as consumers continue to buy the product we are not

continued on page 142



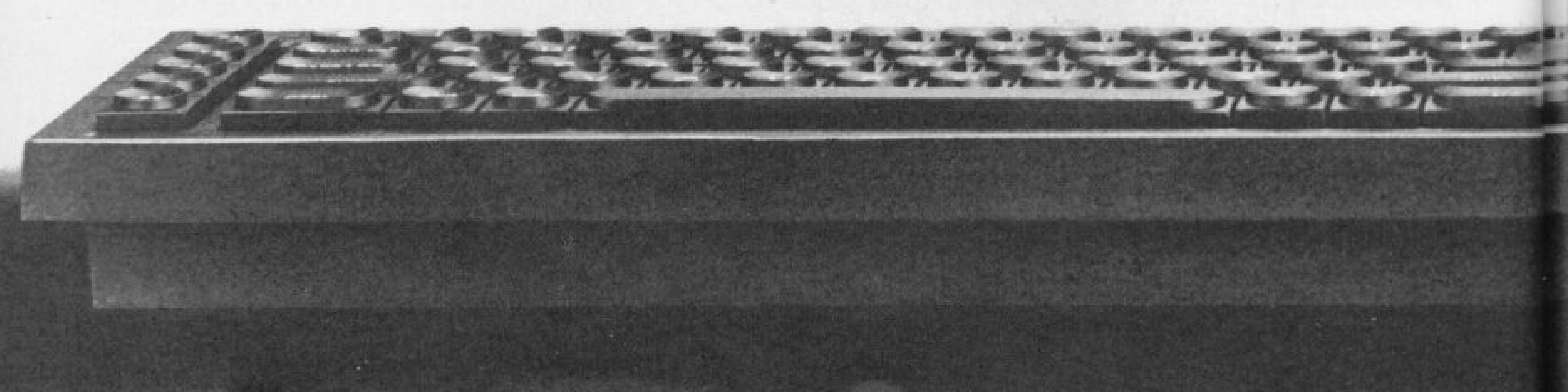
Recommended by Sinclair Research Limited. Guaranteed, designed and manufactured by O.E. Ltd, Cumbria

This modular communications package gives your QL more versatility and potential than probably any other add-on.

Using expansion connectors, the units stack on top of each other to provide a universal communications facility for VT100 emulation, telex, electronic mail, home banking and teleshopping, user-to-user communication, rapid data and word processor transfer between sites, downloadable software and access to the international PSS network and databases such as Prestel and Micronet 800.

The modules can be purchased individually, starting with the Q CON for interfacing, micro-based I/O control, and midrodrive software support for itself and subsequent modules. It accepts any modem, including of course the Q MOD V23 modem. Q CALL provides unattended auto-dial and answering.

Take a quantum leap into com



continued from page 139

going to drop the ZX-81," says Julian. "We'd get lynched if we did."

The company even runs a software club for enthusiasts with a regular newsletter containing letters, hints and tips, program listings and a series of articles by Julian on machine-code.

Perhaps it is the company's recognition of the importance of maintaining a loyal and friendly customer base which ensures its success more than anything else. Selling a ZX-81 game is quite a different proposition from selling for the Spectrum.

"All the support industries base prices on what the source industry can afford," says Julian, "which means Spectrum prices. A ZX-81 program has to be a hit or it won't make any money at all."

The problem is simply that although ZX-81 games tend to be cheaper than Spectrum games in the shops, because the ZX-81 itself is cheaper, the cassettes, labels, duplication and so on all cost just as much, so the profit margins are much lower. Unfortunately many of the enthusiastic programmers who send material to Software Farm do not realise that fact.

"Out of the thousands we are sent lots are no good and many are just not commercial propositions", Julian explains. "The rest have ideas based on the Spectrum market. But you won't get £40,000 for a Spectrum game, yet they think they can make that on the ZX-81. A hit is vital, and even then it is not big money. Then they think they are being ripped off."

With the hi-res series of games, Julian and Sarah appear to have got the business about right. Rocket Man reached 28 in a Gallup survey of top games, which is extraordinary for a market dominated by the Spectrum and Commodore 64. But determination and nerve have been as much a factor in their success as excellence of programming or games design.

Perhaps a clue to Julian's character can be found in his hobby, an esoteric form of karate known as Tang Soo Do, which is concerned with demolishing opponents wearing full body armour—with your bare hands. "Our instructor is the World Champion of All Martial Arts" says Julian. Apparently the man has beaten judo, kung-fu, and karate experts into the ground with his skills. "If you turn up late for a class, you have to spar with him," Julian grimaces.

It certainly sounds like good preparation for taking on the equally well-armoured hordes of Spectrum games producers, and winning shelf space and ratings up there with the best of them. One thing is for sure—there is no room for turkeys on Julian's farm.





The ultimate development from agf



Designed exclusively for the ZX Spectrum, Protocol 4 brings you game control customising in a way that no other interface does. It can accept all commercially standard joysticks, including the Quickshot II with 'rapid fire' or Trackball controllers, and is compatible with ALL Spectrum software. **OPERATES LIKE FIXED OPTION INTERFACES OR CAN BE FULLY HARDWARE PROGRAMMED**

The flexibility of Protocol 4 control is achieved by a specially designed 'CustomCard' system. CustomCards are easily programmed to suit all types of games.

Simply clip in a programmed card for immediate customised control. With preset cards supplied Protocol 4 can emulate the following control standards: AGF/Protek, Kempston and ZX Interface 2 — both players. You can change or reprogram blank cards (1 supplied) to get the responses you want — even on games without joystick options.

Utilising Hardware Programmed technology you have the benefit of automatic eight direction control, no power-down programming loss, guaranteed conflict-free operation with other peripherals, including microdrives, and no extra software to load or awkward joystick movements and key presses to make each time you load another game. The keyboard remains fully operative at all times.

It is also perfectly possible to connect up to five Protocol 4's on one Spectrum, each programmed separately, for multiple player control — only possible with the hardware programmed design.

Incorporated into the design is a computer Reset button for clearing the computer memory between games without pulling the power plug out.

Fully guaranteed for 18 months, Protocol 4 comes supplied with five CustomCards, ten Quick Reference Programming Cards and complete instructions.



PROGRAMMABLE INTERFACE

As the first fully hardware programmed joystick interface, this product has become well established over the past year and will accept ALL standard joysticks or trackballs, including Quickshot II with 'rapid fire', for use with ALL Spectrum or ZX81 software — not just those with a joystick option.

* No Software programming required.
* Programming is *not* lost when power is disconnected between games.
* Eight way movement — with or without the fire button pressed — only requires setting of the four normal directions.
* Compatibility is guaranteed with ALL key reading techniques — machine code or BASIC.
* Several interfaces can be separately programmed and fitted to one computer for multiple player games.

Keyboard operation is totally unaffected by this interface, as with all AGF add-ons, and will never conflict with *any* other device fitted at the same time.

Twelve months guarantee, key programming information and a pack of Quick Reference Cards, to speed up setting of the clips, are supplied with full instructions.

INTERFACE II

The AGF Interface II represents the best low cost introduction to joystick control.

The 'AGF' control standard is now offered by over 100 games or utility programs for use with any joystick or trackball.

Any game which is controlled by the cursor movement keys (5,6,7,8) or has a Protek option is also compatible with Interface II.

A rear connector allows other peripherals to be connected at the same time.

This product is available for either the Spectrum or ZX81, is supplied with full instructions, a 12 month guarantee, and a 12½% discount voucher against further AGF mail-order purchases.

ROMSLOT

The new AGF RomSlot is designed for anyone who already owns a programmable joystick interface, or prefers to use the keyboard to control games, and would like to add the facility of ROM cartridge software to their system.

RomSlot will accept the Sinclair range of instant loading games and will also be compatible with the new releases from Parker Software — exciting new games only to be available in ROM format.

This system allows instant play. Your computer memory size is not important and you will be able to play games that could ordinarily require more RAM.

RomSlot incorporates an extra feature called 'Restart'. This allows you to instantly *restart* the ROM game.

RomSlot is guaranteed for 12 months and has a full width expansion connector to accept joystick interfaces, speech units and printers etc.

QUICKSHOT

The Quickshot joystick is an excellent value game controller incorporating suction cups for sure-footed precision with a comfortably contoured handle offering a convenient top firing button as well as one on the base.

QUICKSHOT II

Quickshot II has improved styling with a trigger type firing button as well as the top firing action, with a broader base for greater suction stability.

It also has a unique 'Auto-Fire' facility which at the flick of a switch provides a constant rapid firing action simulating a fast trigger finger.

	PRICE	TICK BOX OPPOSITE REQUIRED ITEM
AGF Protocol 4	£29.95+£1.00 p&p	☐
AGF Programmable Interface	£24.95+£1.00 p&p	☐
AGF RomSlot	£ 9.95+£0.50 p&p	☐
AGF Interface II	£ 9.95+£0.50 p&p	☐
Quickshot II Joystick	£10.50+£0.50 p&p	☐
Quickshot Joystick	£ 7.95+£0.50 p&p	☐
Extra 'CustomCards' (5 per pack	£ 3.95 inc. p&p	☐
Extra Quick Reference Programming Cards (10 per pack)	£ 0.65 inc. p&p	☐
Specify Computer	ZX81	☐
	Spectrum	☐

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Please debit my Access/Visa/Diners Club Card

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Signature . . . .

My Name . . . .

Address . . . .

Send to: AGF Hardware, Dept CVG, Freepost, Bognor Regis, West Sussex, PO22 9BY.
Trade Enquiries ring (0243) 823337

There's nowhere else to go

agf

Contents

More from our postbag below, and on page 150 Mike Wright takes a look at new improved versions of old software.

SINCLAIR BUSINESS USER

January 1985

Excommunicated!

I TENDED to feel, at first, that Mr Simmonds — October — was a little harsh when speaking of **Vu-Calc.** In practice, however, the program is little more than an unmitigated disaster.

The program can be difficult to load, often will not respond to commands, frequently crashes and inevitably loses all one's hard won data.

I use the program in connection with the local church accounts and I dare not lose any more data or the Vicar will excommunicate me.

For my part, the theoretical facilities are adequate but the appalling unreliability and continual loss of data even in a simple spread-sheet have rendered the program unusable and caused me a lot of embarrassment. It is far safer to do things the old, hard way by hand and, strangely, it is much faster.

Can anyone tell me is Omnicalc is any more reliable? I don't care about extra facilities.

W L Simpson, Wimborne, Dorset.

Proportional spacing

REFERRING to your answer to Charles Lane, *Sinclair Business User* November 1984, as I understand it the term 'proportional spacing' has now come to mean one of two things: (i) words can be moved to square up lines of text so that there are equal gaps measured in units of less than one character space; (ii) it is possible to specify exactly how much space is to appear between each letter i.e. an 'm' will take more space than an 'i'.

I have been using a Juki 6100 Daisywheel printer, with **Tasword 2** as the word processor program. That printer supports proportional spacing of type (ii) above. I wish to print, as Mr Lane, justified right hand edge proportional print — to look the same in your magazine — but as yet I have not found any program which will do it using the Spectrum.

Dr R M Megit, Hastings, Sussex.

Transform warning

FIRST, congratulations on an ever-improving magazine. Looking over back issues it certainly would appear that your editorial staff do take note of valid criticism — and the result is less trivia, more interest, in your letters pages.

Next, a warning to potential purchasors of the professional keyboard from Transform. I recently ordered one. It didn't work at all. To the company's credit they sent a replacement PCB and connectors by return.

However, having tested the keyboard for response, I then assembled it; loading from tape was all right but programs crashed on running, the UDGs were corrupted, and other lines.

Microdrive loading was even worse. Apart from program corrupton, the machine commands — SAVE and MERGE — were interfered with, and the microdrive would not stop.

Transform is obviously aware of those problems, as enclosed with the keyboard is a letter admitting that, offering an add-on buffer at £6.95.

If the problem is so well known, why isn't the original board modified to include the buffer?

L S Delby, Shefford, Bedfordshire.

Software in the toolroom

I OWN a 48K Spectrum, and I wish to know if there is a software house which produces a program on the skills of carpentry and joinery.

J Mitchell, 9 Clive Avenue, Crayford, Kent.

Shop Window

SHOP WINDOW enables you to publish details of programs with limited markets once only in Sinclair Business User, *at no charge. If readers would like details to appear regularly they can advertise in Sinclair Supermart.*

Mozart. Three 48K programs giving details of the Köchel catalogue of Mozart's music. Program 1) deals with the complete catalogue, and programs 2) and 3) with instrumental and vocal music respectively. Each costs £5 from John Halsall, 18 St Michael's Close, Exeter EX2 8XH.

Cub Pack Record. A record system for Cub Scout Leaders, with analyses, promotion and proficiency tables. 48K Spectrum. Roger Missing, 16 Kedlestan Drive, Orpington, Kent BR5 2DR. Price £5.

Hair Defenders. Program 1 deals with knowledge of hairdressing, programs 2 and 3 with scientific aspects of hair care. 48K or 16K. John Lyons, 6 Queens Road, Camberley, Surrey, GU15 3AN. £5.75 or £15.00 the set.

Organic Chemistry. Draws ring-containing structural formulae, from simple compounds to steroids and antibiotics. Handles heteroatoms, stereochemistry, bond types, and substituent groups. 48K. M Davis, Dept of Chemistry, La Trobe University, Bundoora, Vic, Australia 3083.

Survey II. Analyses questionnaire data. Generates full frequency distributions, histograms, cross tabulations, chi-square statistics. 48K Spectrum, from Lobos Software, 10 Randall Place, Bradford BD9 4AE. Price £10.00.

Curtain Estimator and Receipt Printer. 16/48K. Calculates all curtain requirements from bare window measurements, and prints a receipt of details. Plushscale Ltd, 14-16 Little Walk, Harlow, Essex CM20 1HY. £24.99.

Track down share-outs

Mike Wright finds how to keep stock of your shares

AT THE TIME of writing a major advertising campaign is being run to persuade as many ordinary people — in other words, you and I — as possible to buy British Telecom shares and so start dabbling in the stock market. For those of you who have got your feet wet in the sea of shares ownership **VA£TRACK 2** from Morley Davies Associates may be of some interest.

It is a share portfolio management system for use by chartists — those who believe that share price movements reflect the relevant information and that the analysis of those movements leads to correct decisions on buying and selling. The original version was developed for the ZX-81 but was never made commercially available.

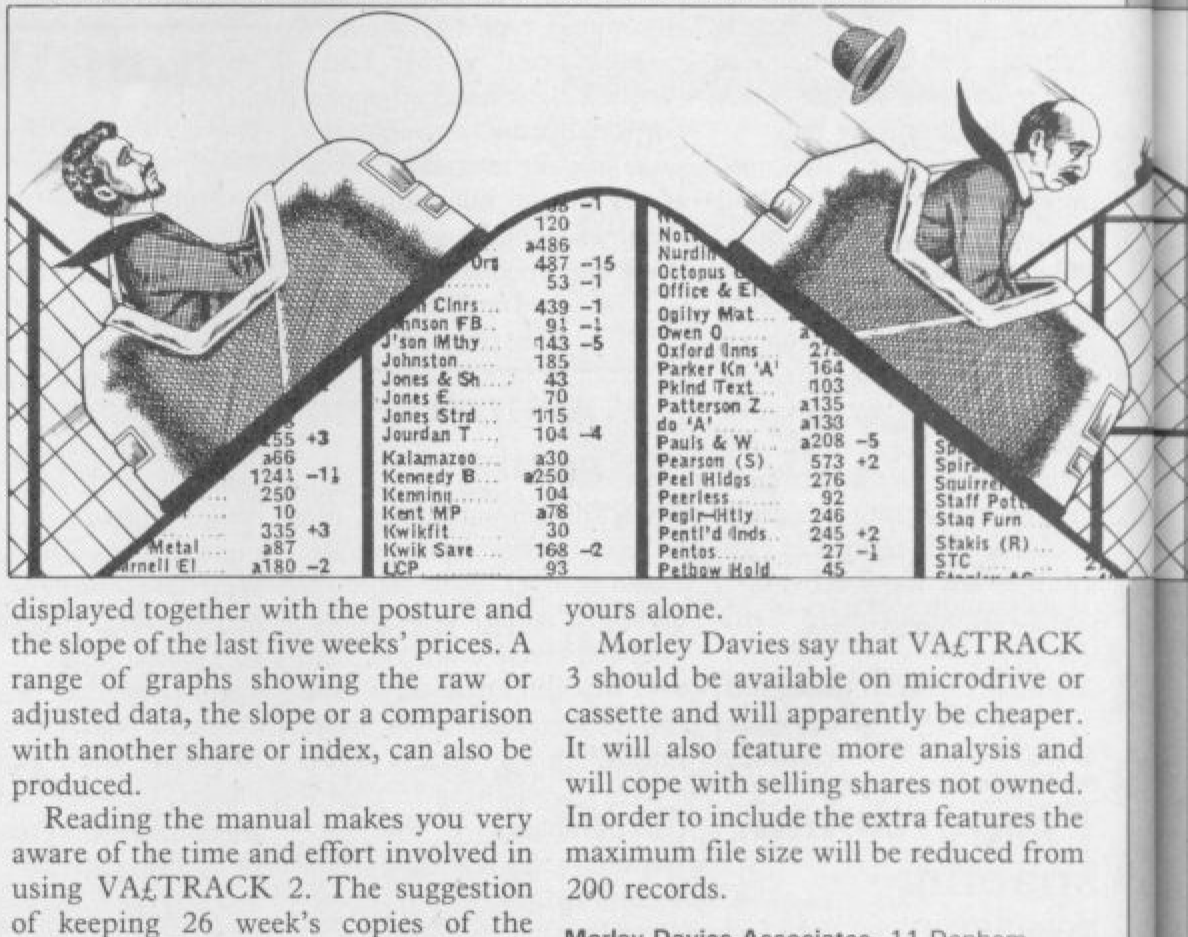
VA£TRACK 2 is supplied with a 22-page manual which tries to explain not only how to use the program but also something of the philosophy of buying and selling shares. It is one of the best written and easiest to read you are likely to come across. The program is recorded on both sides of the cassette with a file of dummy records also recorded on the first side. It is loaded using the command CLEAR 64500: LOAD " ".

The basis of VA£TRACK 2 is a list of weekly share or index prices over the last half year and that your portfolio comprises shares from some of those. Share values should be updated weekly from the Saturday edition of the *Financial Times* and that copies of the last 26 weeks' issues are kept in case you need to add data for other shares. Alternatively, Morley Davies will supply additional history tapes which give 26 weeks' prices for specified shares.

The program has facilities for listing the records to the screen or printer, adding new records either manually or from additional history tapes, doing a weekly or an interim update of share prices, valuing your portfolio as well as loading and saving files. Options are also available for generating test records or examining the postures, or trends, of all or part of the records.

Five postures are used based on comparisons of the five and thirteen week moving averages and last week's price. The large amount of calculation necessary for posture tracking makes the process painfully slow. The manual recommends that you make a cup of coffee afer selecting this option but a three course meal may be nearer the mark for a large number of records.

Individual records can be put under the microscope by selecting option 0 from the main menu. After entering the record number a subsidiary ten option menu is provided that lets you analyse the last 13 weeks' data in either raw (unadjusted) or adjusted (price changes are smoothed by reducing all movements to less than 10 per cent) form. In both cases five and 13 week arithmetic and expònential moving averages are displayed together with the posture and the slope of the last five weeks' prices. A range of graphs showing the raw or adjusted data, the slope or a comparison with another share or index, can also be produced.



Reading the manual makes you very aware of the time and effort involved in using VA£TRACK 2. The suggestion of keeping 26 week's copies of the *Financial Tiimes* is frightening (aren't computers supposed to cut down paperwork?), and the thought of spending an hour and a quarter entering details of a mere 20 shares or even fifty minutes on a weekly update of 200 shares may fill you with horror (aren't computers supposed to save time?). However it is difficult to see how those operations can be shortened unless it is by the use of an optical character reader or modem and bulletin board.

The posture tracking takes an age to complete but to say it is slow does not take into account the large number of calculations involved or the time it would take to do it by hand.

One very pleasant surprise was the way in which you are protected from yourself. Selecting an option from a menu requires only one key stroke and invalid options are ignored. Typing errors which in most programs would be fatal, such as entering characters when the program is expecting numbers, either result in being asked to input again or jumping to the date screen at the start of the program. It would be nice if some of the larger software houses paid the same attention to detail.

VA£TRACK 2 is most definitely for use by the dedicated stock exchange dabbler — others are likely to find the amount of work necessary to get a return an inconvenience. If you are considering it then remember it is only a tool — the interpretation of results and the decisions made on them are yours alone.

Morley Davies say that VA£TRACK 3 should be available on microdrive or cassette and will apparently be cheaper. It will also feature more analysis and will cope with selling shares not owned. In order to include the extra features the maximum file size will be reduced from 200 records.

Morley Davies Associates, 11 Denham Lane, Chalfont St Peter, Bucks SL9 OER

VA£TRACK 2
Memory: **48K**
Price: **£48.75**
Gilbert Factor: **7**

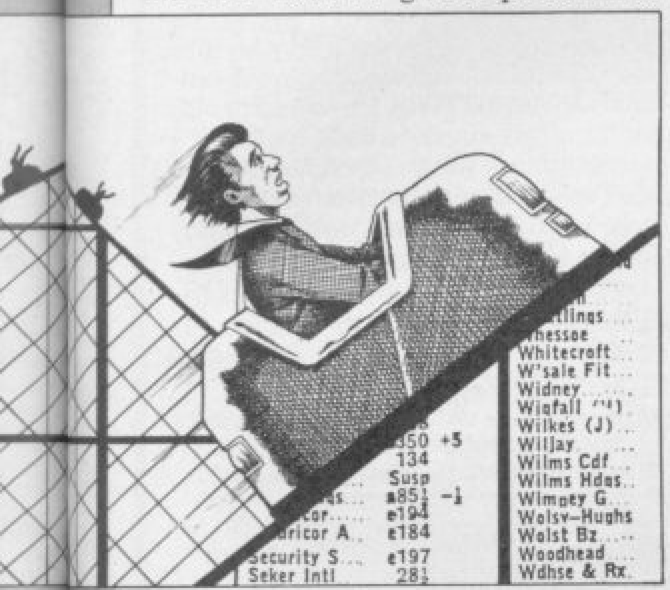
Something old, something new

A survey of extras

UNLIKE GAMES software which, in general, achieves volume sales rapidly before virtually disappearing, applications software tends to sell steadily and have a much longer life. Many applications programs are developed and improved during their life. With the *Sinclair Business User* section just over a year old it is a good time to look at the updates to some of the programs we have reviewed.

The very first review in December 1983 was of the OCP **Finance Manager** for the 48K Spectrum. That has been upgraded to include microdrive compatibility, allowing both the program and data to be saved separately to face. That set up routine is only used when loading from the original tape.

Saving the program — to tape or microdrive — also saves the printer interface codes to give a personalised version for subsequent use. The printout for the +80 version shows the date of transaction, the account, the details, separate columns for debit and credit and the balance. That compares with the date, account, amount and balance on the ordinary version.



the program the option of cataloguing a cartridge is not included.

The +80 version of the program, for use with full-sized printers, has had a further refinement added. Previously the program could only be used if you had the Kempston Centronics interface, now it has been programmed to offer a choice of 15 different interfaces — ten Centronics and five RS232 — or to set up the codes for any other printer interany microdrive attached. The program is supplied on casette and still includes a facility for saving to tape. Although the program can now be run from microdrive and data files loaded within

OCP has upgraded its other programs in the same way. According to Francis Ainley the good news for QL owners is that he is working on an enhanced program allowing a class heading, in addition to the account and description, to be used with the transaction. The program is likely to feature some sort of windowing.

Upgrading to microdrive compatibility was not possible with the Transform **Sales/Purchase Ledger/Invoicing** package as it was designed to run using twin microdrives anyway. Instead, improvements have been made to the Accounting program. Previously it was only possible to produce an overall total figure for all, or some, of the accounts by loading each account separately, noting totals and adding them up. Now a series of extra menus allows the list of accounts to be displayed and any combination of those to be selected and totalled. Accounts can be erased from a cartridge as another option. The package was reviewed in the November issue.

The Kemp **Stock Control** program was reviewed in the August issue and version 3.0 has been released recently. Like any other programs which have been improved Stock Control is now microdrive compatible but the improvements do not end there. It now has the option of selecting a full-sized printer and a 64-column printout.

If a full-sized printer is to be used and your printer interface needs software to drive the printer then that must be loaded each time before the program. The option of a full-sized printer must also be made every time. Although the resulting printouts are more widely spaced they are no more informative than those on the ZX printer.

Other improvements include making the length of the stock numbers and descriptions user definable. The stock number can be up to ten characters long while the stock description, previously 20 characters, can now be set at any length between 4 and 30 characters. Of course, the more characters used for those fields the less room there will be for the records.

Another improvement now allows up to two decimal places to be used for stock quantities. With those improvements this is now the most flexible stock control program available on the Spectrum.

It is difficult to imagine many improvements which could be made to **Tasword II,** the word processing program from Tasman Software. Instead, Tasman has released its equivalent of Wordstar's Mailmerge program called **Tasmerge.** The program is designed to operate with Tasword II and the Campbell Systems **Masterfile** and allows you to insert names and addresses from a Masterfile database into a standard document produced using Tasword II.

Now that it has a mailmerge facility Tasword II is once again streets ahead of its nearest rival, although the Softek word processor for the Wafadrive will be a strong contender if rumours of a database and a mailmerge facility are true. With Tasword II and Masterfile included as part of the microdrive/interface 1 Expansion Pack Tasmerge has a whole new market.

Speaking of Masterfile, that has been improved since it was reviewed last February. The latest version — version nine — comes in a smart plastic case and now includes MF Print which allows Masterfile to print to full-sized printers. That is done by allowing the user to set up and save the outline report exactly as it is to be printed. The blank report must then be loaded before printing out the selected records.

Unlike the ordinary report formats for the ZX printer only one report can be held in memory at one time. Others must be loaded when needed. In addition numeric data can be printed in a variety of formats including integer, two decimal places, with commas showing thousands and prefixing any character such as a currency sign. With those improvements the best database for the Spectrum is now even better.

Mike Wright

Campbell Systems, 15 Rous Road, Buckhurst Hill, Essex IG9 6BL.
Kemp Ltd, 43 Muswell Hill, London N10 3PN.
OCP Ltd, 4 High Street, Chalfont St Peter, Buckinghamshire SL9 9QB.
Tasman Software, Springfield House, Hyde Terrace, Leeds LS2 9LN.
Transform Ltd 41 Keats House, Porchester Mead, Beckenham, Kent.

Illustration: Stuart Briers

software that's hard to beat...

48K SPECTRUM

TASWORD TWO

The Word Processor ✱

"If you have been looking for a word processor, then look no further."
CRASH June 1984

"The number of on-screen prompts, together with the excellent manual, make it ideal – even for an absolute beginner."
PERSONAL COMPUTER WORLD
September 1983

"Without doubt, the best utility I have reviewed for the Spectrum."
HOME COMPUTING WEEKLY
April 1984

Your Spectrum becomes a professional standard word processor with TASWORD TWO. Sixty-four characters per line on the screen is just one of the many features of this versatile program. The cassette also contains TASWORD TWO TUTOR. This teaches you word processing using TASWORD TWO. Whether you have serious applications or simply want to learn about word processing, TASWORD TWO and TASWORD TWO TUTOR make it easy and enjoyable. TASWORD TWO is readily adapted for the microdrives to give super-fast saving and loading of both program and text.

PRICE £13.90

TASCOPY

The Screen Copier

Screen copy software for ZX Interface 1. Print high resolution screen copies (in a choice of two sizes), and also large "shaded" copies with different dot densities for the various screen colours. Tascopy supports all eight pin dot matrix printers with Epson type control codes. e.g. Epson RX-80 and FX-80, Shinwa CP-80, Mannesmann Tally MT-80, Star DMP 510/515, Brother HR5.

PRICE £9.90

TASMERGE

The Mail Merger

Transfer data from MASTERFILE to TASWORD TWO! Letters and forms typed on TASWORD can be printed with addresses and data taken from MASTERFILE. The mail merge facility allows, for example, multiple copies of a letter to be printed, each containing a different name and address taken from your MASTERFILE data. To use TASMERGE you must have one or more microdrives as well as TASWORD and MASTERFILE by Campbell Systems. (version 9 or later).

PRICE £10.90

TASPRINT

The Style Writer

A must for dot-matrix printer owners! Print your program output and listings in a choice of five impressive print styles. TASPRINT utilises the graphics capabilities of dot-matrix printers to form, with a double pass of the printhead, output in a range of five fonts varying from the futuristic DATA-RUN to the hand-writing style of PALACE SCRIPT. TASPRINT drives all dot-matrix printers with bit image graphics capabilities and can be used to print TASWORD TWO text files. TASPRINT gives your output originality and style!

PRICE £9.90

TASWIDE

The Screen Stretcher

With this machine code utility you can write your own Basic programs that will, with normal PRINT statements, print onto the screen in the compact lettering used by TASWORD TWO. With TASWIDE you can double the information shown on the screen!

PRICE £5.50

TASMAN PRINTER INTERFACE

Plug into your Spectrum and drive any printer fitted with the Centronics standard parallel interface. Supplied complete with ribbon cable and driving software. The user changeable interface software makes it easy to send control codes to your printer using the method so successfully pioneered with TASWORD TWO. The cassette also contains fast machine code high resolution full width SCREEN COPY SOFTWARE for Epson, Mannesmann Tally, Seikosha, Shinwa, Star, and Tandy Colour Graphic (in colour!) printers. Compatible with microdrives and ZX Interface 1.

PRICE £39.90

TASMAN SOFTWARE
All prices include VAT and post and packaging.
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✱ Available from larger branches of Boots.



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SOFTWARE

Springfield House, Hyde Terrace, Leeds LS2 9LN. Tel: (0532) 438301

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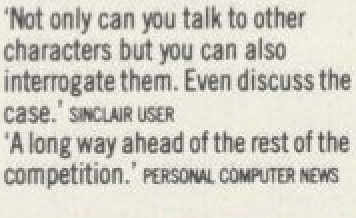


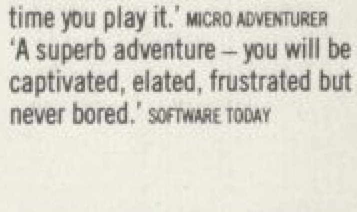
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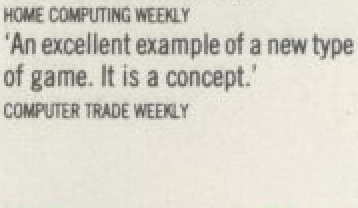
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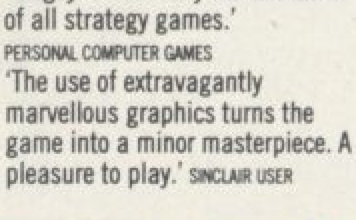
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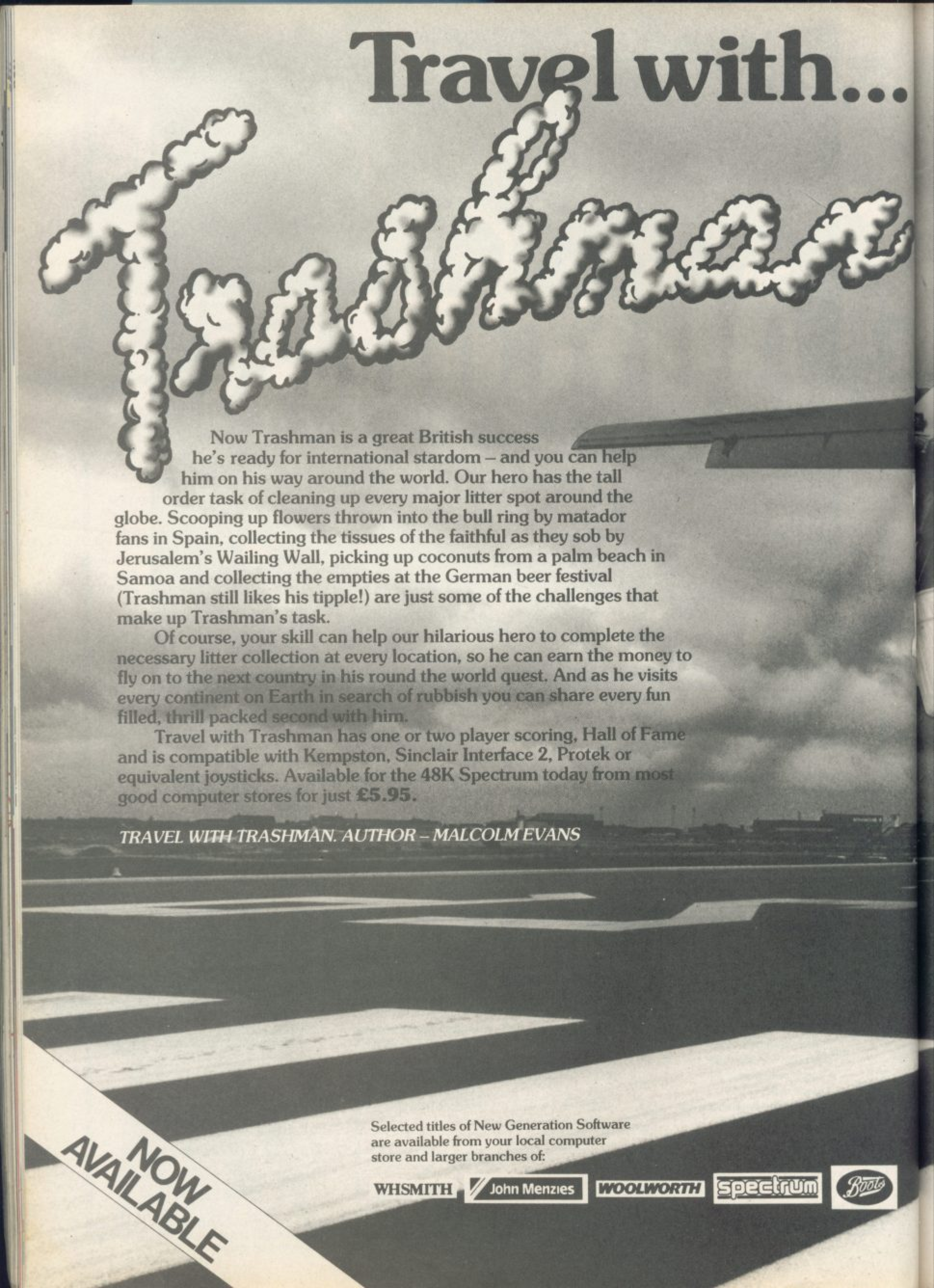
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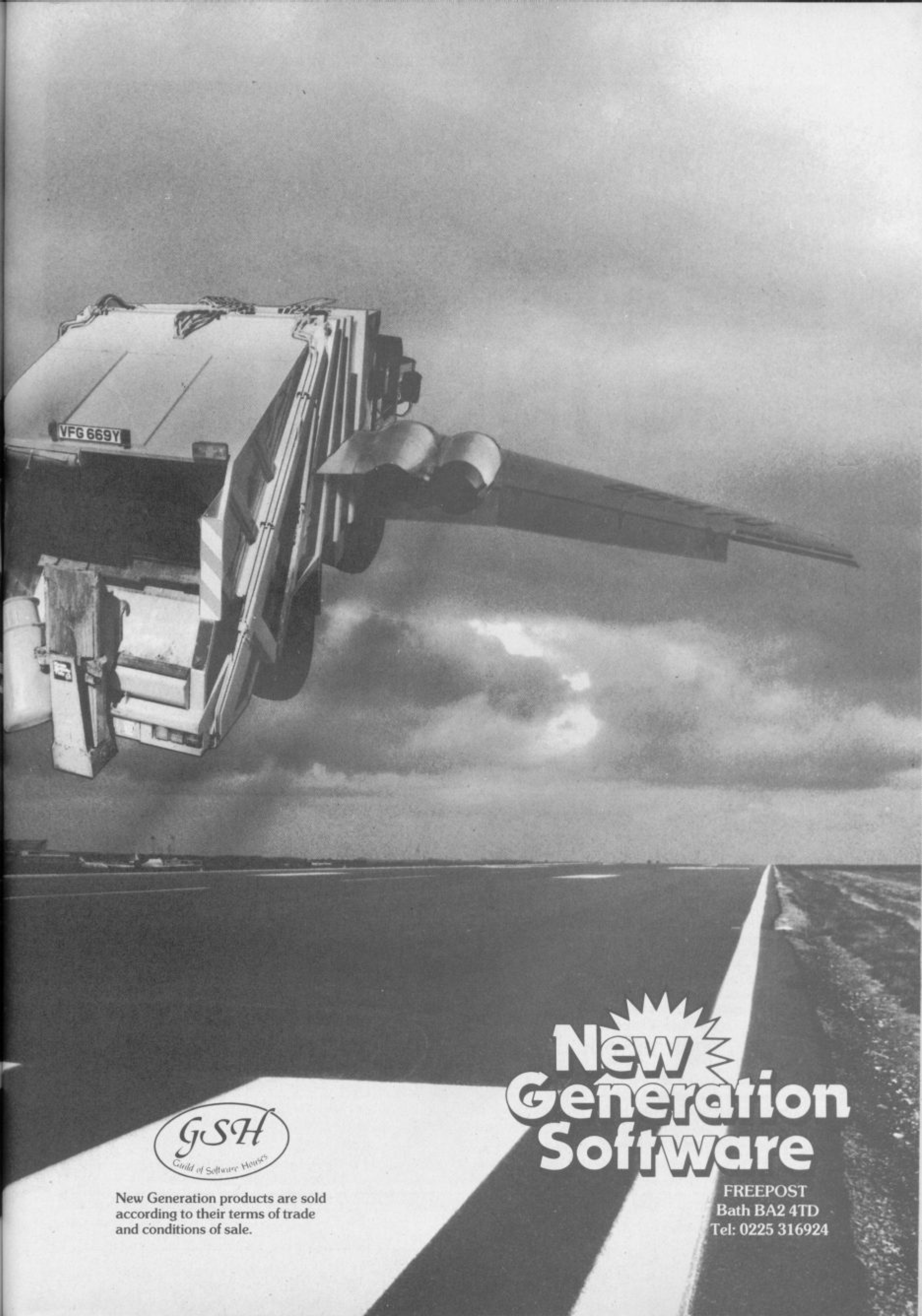
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Pat on back for Longman

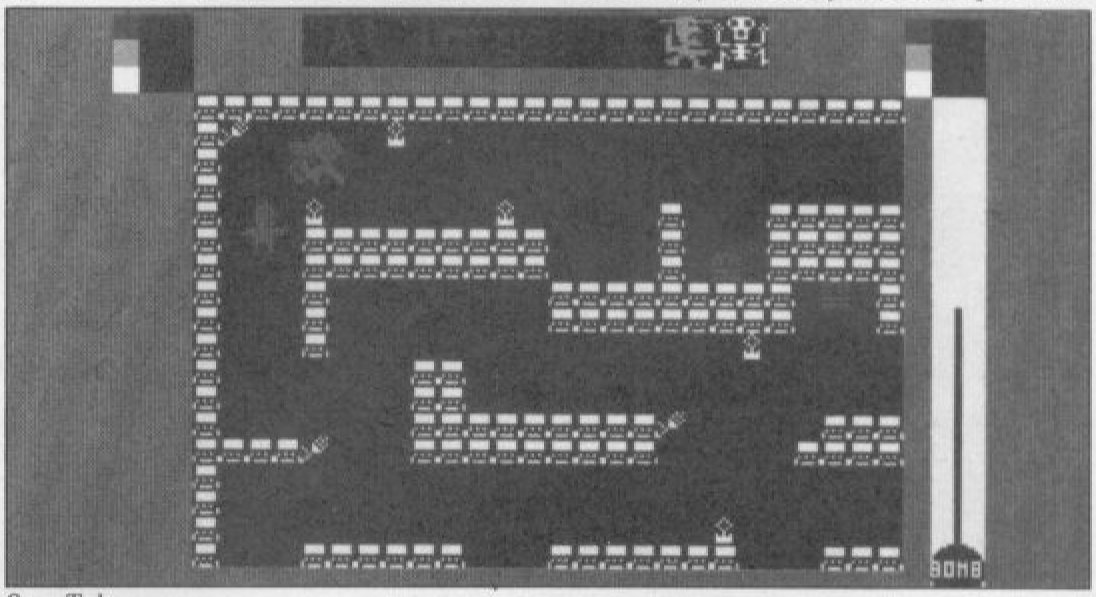
Theodora Wood assesses a new range of software

WITH THE plethora of learning programs available for use in the home, it is difficult for the prospective buyer to sort the wheat from the chaff. Comparisons are odious, but can be very useful as a guide. The recently released range of programs from Longman can serve as a yardstick to measure the value of some offerings in this field. The Longman Group having published educational texts for many years brings a wealth of experience to software publishing.

Software aimed at the under-11 age group, has to provide a certain degree of entertainment. Programs with a major undisguised element of sustained skill learning are unlikely to be popular with children at home.

The Mr T range of programs from Ebury software, under the *Good Housekeeping* label, was a minor breakthrough in early learning. The programs covered numbers, shapes, measuring and the alphabet, all superbly presented in the form of games designed to appeal to the pre-school age group. They provided good graphics and an educational strategy which would not be out of place in a primary school. New titles include **Mr T in the Mystery Maze,** which shows a move towards problem-solving skills for seven plus.

The Longman range for that age group includes **Hot Dog Spotter, ABC . . . Lift Off** and **Countabout.** Those are standard programs which feature arcade routines as part of the action and have proved just as popular as the Mr T programs. The new Longman program, **Postman Pat's Trail Game,** based on the books and TV series, encourages thinking and memory skills as well as the use of the cursor keys. Postman Pat — such an inoffensive character — has to follow the trails left by various characters in the story clutching a letter or parcel. He then has to find his way back to the Post Office without help from the tracks. Greendale is pictured on the screen complete with sheep, hedges and bridges, as well as cows which block the road from time to time at the more difficult levels. For a four-year-old Postman Pat Rules!



SuperTed

SuperTed is a similar program, except that this time our hero has to try and catch the villains and put them in jail before a bomb goes off. Quite delightful. A format of nine mazes is the playing area and the positions of the villains are shown on a small grid at the top of the screen. Speed and accuracy of movement round the playing areas require care, though the speed is rather too slow. It would have been useful to have a selection of playing speeds. Both programs benefit from joystick control.

Longman's middle range of programs for the 7-11 age group has nothing in particular to recommend it. That is not to say that the programs are not good, but merely that they are on a par with others. **Robot Runner,** a tables tester, **Wild Words,** a spelling tester, and **Sum Scruncher** all bear the Longman stamp of drill mixed with arcade routines. Numerous other companies provide similar programs, notably Mirrorsoft's **Quickthinking,** Sinclair's **Castle Spellerous,** and Stell Software's **Maths Invaders.**

Other new titles for the Spectrum from Longman feature programs aimed at the family, capable of supporting up to four players. In **Riddle of the Sphinx** you have to build up words on one face of a pyramid, always starting with the letter that finished the previous word. **Word Wizard** asks the players to make anagrams out of a specified number of letters. To play **Snaffle** you have to use letters as they appear on the board and build a word out of them, as well as snaffle an opponent's word to make a new combination. If a word is not in the dictionary the players can verify that such a word exists. Snaffle is the most interesting game but also the most expensive of the three.



Postman Pat's Trail Game

continued on page 159

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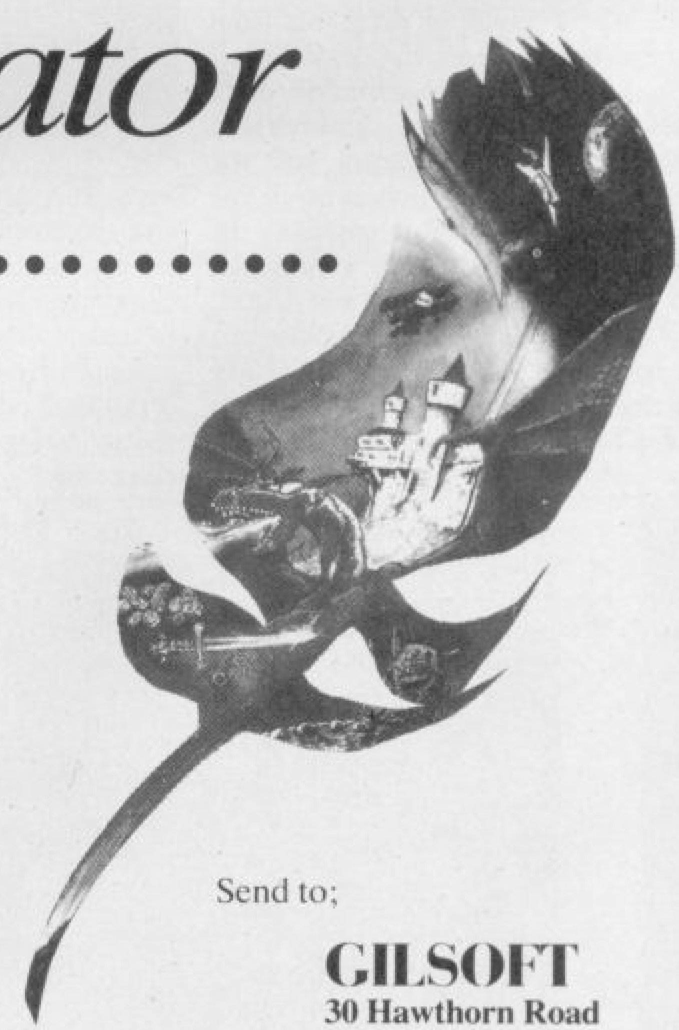
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continued from page 157

A new company, Hill McGibbon, is set to be a rival to Longman for this age group. Formed by three ex-Heinemann people it brings long-standing experience in publishing to the field of software development. Hill McGibbon policy is to produce games of high entertainment quality in themselves, but which have an underlying educational content. New games for the Spectrum include **Run, Rabbit Run,** a board game with strategic possibilities and **Friend or Foe** which is similar, both priced reasonably. The catchphrase, 'games to stretch the mind' could set the tone for software in the future.

Longman, however, has in **First Moves** a program to teach chess for eight-year-olds upwards. Chess is surely the greatest strategy game of all time, and any program which smooths the way to understanding of the complex nature of the game must be useful. The program concentrates on the chess pieces and their moves, and comes complete with a full colour poster for handy reference.

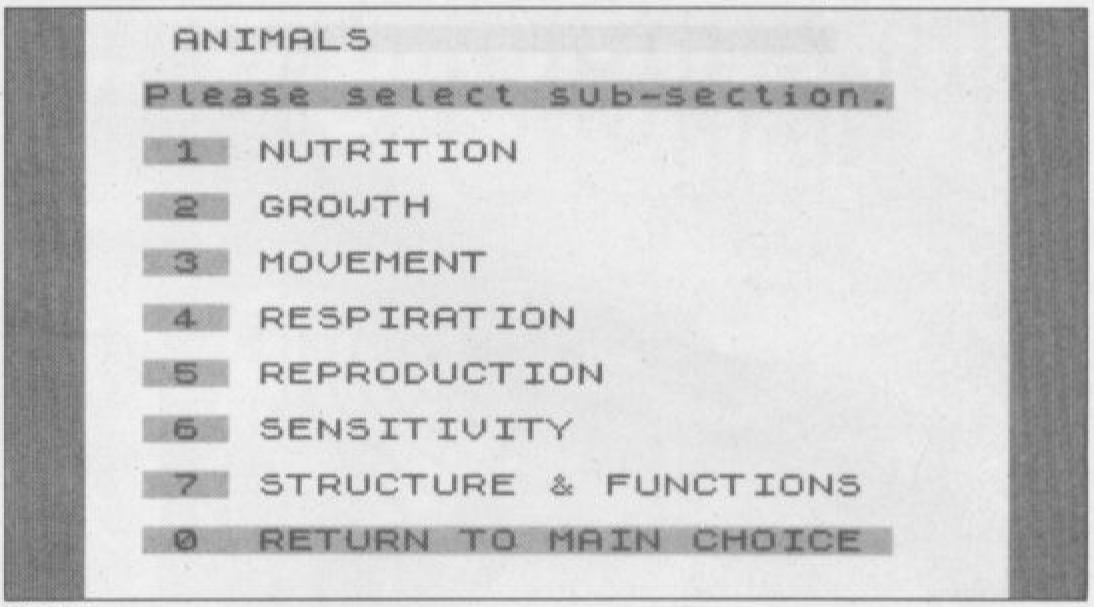
A joystick is a great aid to moving the pieces, otherwise rather a complex manipulation of the numbers one to eight is required.

The main disadvantage is that the screen board is tiring on the eyes. Longman does not help by using green and magenta for the board colours, and even with the colour turned down there is a certain amount of drift.

The program takes the user through all the moves of the pieces before starting any games, although you can go straight to the games if you wish. The games start with few pieces: level one is the King and his castle, going on to an almost complete game in level six using one of all the pieces with accompanying pawns. A Help key is available to show where each piece can be moved when it is the player's turn.

Self study is becoming a topic of serious consideration for schools, providing the chance for a student to learn at his/her own pace, and Longman is uniquely placed for this. The revision package **French** O level and CSE has to be considered the best of its type.

Chalksoft's **Eiffel Tower** is a French vocabulary tester providing 20 word lists in two programs for £9.25. The Longman program has 29 word lists in two programs which have comprehensive testing facilities. Sulis Software has produced a package to revise French irregular verbs, at £9.95. The Longman



Kingdom

package contains a program which enables the student to revise the same.

As well as those two facilities the Longman program has a composition tester, where the user has to remember a short piece of French prose and then ENTER it, and a map-based program highlighting the regions and towns of France. The price is £7.95, which must be considered a good buy under the circumstances.

The revision program **Biology** shows a similar range of activities. There are five programs. **Text** carries nearly 400 references over the subject, and the student is advised to make a note of those on his/her syllabus, and pay particular attention to those marked with a star. **Skeleton** is a word game which asks questions and builds up a picture of a skeleton with labels.

Heredity covers just that, but in an interactive way. It tests knowledge of the principles of heredity by asking the student to forecast the outcome of a particular mating in the form of a percentage. You are also able to set up breeding combinations and see what happens. **Kingdom** is an exploration of the main types of creatures and plants. A specimen or example can be identified by its characteristics.

It is also possible to compare the different types of life form. This is an excellent way of coming to grips with all those long Latin names as well as gaining an overview of the main classifications used.

Food covers the major components of nutrition and tests knowledge of the same.

Both the French and Biology packages appeal within their limitations, and represent reasonable value for money; they also help with revision strategy and organisation of time by pinpointing areas of the subjects concerned with precision.

Overall, the Longman range for the Spectrum seems particularly strong in the rule and drill and revision departments but lacks a variety of strategy, problem-solving games and adventures. First Moves excepted. That is probably a result of the company's involvement in educational texts which leads it to concentrate on those formats rather than enter what might perhaps be considered a more creative use of the Spectrum.

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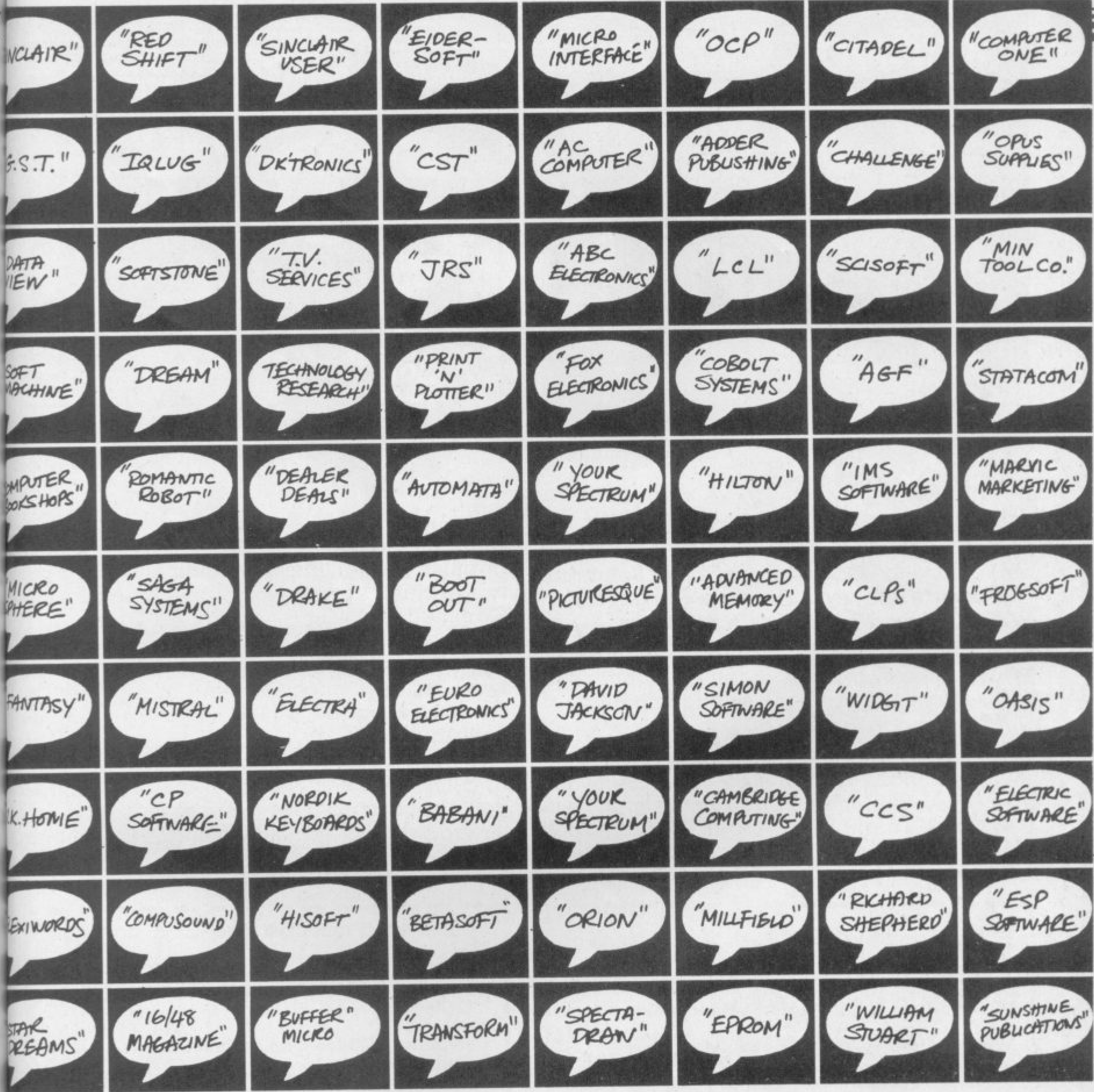
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Alan Pratt cooks up a method of organising program structure

MenuMaster

FOR ANYONE who wishes to use a Spectrum for other purposes than playing games there is a wealth of literature aimed at teaching the Basic language. Many who have mastered aspects of that find themselves directed towards writing games programs rather than more serious applications. The main reason for that is the lack of direction in the literature towards developing business or educational type programs.

We can, however develop a technique for writing non-games type programs which is both simple in concept and in widespread use already. The resulting programs come under the general category of Menu Driven Programs.

Many who have decided to delve into the Basic language quickly become disillusioned because of its apparent unstructered nature. That means the majority of programs are difficult to break down into definite sections. They are like a book with only one paragraph covering several pages.

It is possible to write a program in Basic as a series of sections each of which can be RUN as a separate program without necessarily relying on all the other sections. That is exactly how a menu driven program is constructed, with the menu section forming the skeleton from which other sections are accessed. Many commercial programs for large computers are menu driven as the operators are not programmers. From the programmer's point of view the advantages of having separate sections is that each can be made error free before the next is written.

The main section containing the menu displays a set of options available to the user with some means of selecting between them. That can take various forms but the simplest is to number each option. All the user has to do is to press the correct number on the keyboard. It is the options which consititute the independent sections.

We will develop a program which is menu driven whilst describing the techniques used and how they apply to any program of that type. The program is a graphics character generator which allows you to develop a large character composed of 12 normal-sized characters arranged as three rows of four columns. The large character is drawn eight times full size on a grid occupying the full screen with a 'pen' which is capable of both drawing and rubbing out. The final large character can be displayed full size and saved on tape for future use by Program 1 and Program 2.

The second program uses the characters to illustrate the letters of the alphabet and is intended as a teaching program for young children. It is also menu driven to further illustrate the techniques.

You will probably have met a menu driven program on the second side of

continued on page 166

new: detects if a character has been drawn or loaded from tape 0=no, 1=yes.
a=0, b=1, e=7: those frequently used numbers are stored in variables which are then used in place of the numbers to save memory.
menu=200 (defines the line number 200).
n$(10) contains the name of the character (used in LOAD/SAVE to tape).
w$ is a frequently used comment.
e$(13) used to blank out 13 characters on the screen.
d(8) used in the binary conversion loop.
c(24,4) holds the numeric values of each byte in the character.
a(24,32) holds the contents of the full screen 1=filled in square, 0=empty square,
i, j, k, m are temporary variables.
j$ is a temporary string.
t and **t$** are used in 'Fill a$()' to reconstruct the full screen display from the numbers in c().
r and **c** are used to define the pen tip on the screen as row and column numbers.
r1 and **c1** are temporary values of r and c.
p determines if the pen is to rubout or draw: −1=rubout, 1=draw.
q and **w** are used to detect which of the cursor keys are being pressed. These are read using IN statements.

Table 1. Variable list for Program 1.

```
  10 REM        BIG GEN
  20 REM   ©  A. Pratt   1984
  30 REM
  40 LET a=0: LET new=a: LET b=1
 LET e=7
  50 PAPER e: INK a: BRIGHT a
  60 DIM n$(10): DIM e$(13): DIM
 d(8)
  70 DIM c(24,4): DIM a$(24,32)
 100 POKE 23658,8
 110 RESTORE 6000
 120 FOR i=new TO 15: READ j$: P
OKE USR "s"+i,VAL j$: NEXT i
 130 FOR i=b TO 8: READ d(i): NE
XT i
 140 LET w$="WAIT A MINUTE"
 150 LET menu=200
 200 REM Menu
 210 BORDER e: CLS : PRINT INK e
; PAPER b; BRIGHT b;"       BIG GR
APHICS GENERATOR     "
 220 FOR i=b TO 3: BEEP .03,3: B
EEP .06,b: NEXT i
 230 PRINT AT 2,e; BRIGHT b;"Sel
ect your option"
 240 PRINT AT 4,e;"Draw a New Ch
aracter"
 250 PRINT AT 6,e;"Instructions"
 260 PRINT AT 8,e;"Redraw Existi
ng Character"
 270 PRINT AT 10,e;"Display the
Character"
 280 PRINT AT 12,e;"Display the
Numbers"
 290 PRINT AT 14,e;"Save the Cha
racter"
 300 PRINT AT 16,e;"Use a Saved
Character"
 310 PRINT AT 18,e;"Use Graphics
 A to L"
 320 PRINT AT 20,e;"End the prog
ram"
 340 LET j=4
 350 LET i=CODE INKEY$-48: IF i>
0 AND i<10 THEN GO TO 400
 360 PRINT INK a;AT j,2;(j-2)/2
 370 LET j=j+2: IF j=22 THEN LET
 j=4
 380 PRINT INK e;AT j,2;(j-2)/2
 390 GO TO 350
 400 REM Sort out choice
 410 GO TO i*300+200
 500 REM New character
 510 BORDER 5: CLS : PRINT AT 2,
9; BRIGHT b;"New Character";AT 1
3,9;w$;AT 11,9; INK e; PAPER 2;
FLASH b;"INITIALISING."
 520 DIM c(24,4): DIM a$(24,32)
 530 FOR i=b TO 24: PRINT AT e,1
5;i
 540 FOR j=b TO 32
 550 LET a$(i,j)="0"
 560 NEXT j: NEXT i
 570 BORDER 6: CLS : PRINT AT 2,
9; BRIGHT b;"INSTRUCTIONS"
 580 PRINT '''"Use the arrow key
s , 5 to 8 , tomove around the g
rid."
 590 PRINT '''"To turn the pen on
and off pressthe , 0 , key."
 600 PRINT '''"  Once the pattern
is complete    press , C , to c
ontinue."
 610 GO SUB 5000
 620 BORDER e: CLS
 630 FOR i=a TO 255 STEP 8
 640 PLOT i,a: DRAW a,175: NEXT
i
 650 FOR i=a TO 175 STEP 8
 660 PLOT a,i: DRAW 255,a: NEXT
i
 670 FOR i=a TO b: FOR j=a TO 31
 680 PRINT #0;AT i,j;"S"
 690 NEXT j: NEXT i
 700 LET new=b: GO TO 4200
 800 REM Instructions
 810 BORDER 5: CLS : PRINT AT a,
9; BRIGHT b;"INSTRUCTIONS"
 820 PRINT '"BIG GEN allows you
to draw largeGraphic Characters
composed of  12 normal character
s arranged as3 rows of 4 charact
ers."
 830 PRINT "Each normal characte
r is made upof 64 pixels (or dot
s) on a 8x8 grid hence each larg
e character is composed of a 32x
24 grid."
 840 PRINT "The character is dra
wn magnified8 times. A highlight
ed cursor   square is moved arou
nd the grid using the arrow keys
."
 850 PRINT "The cursor (+) is be
st treated  as the tip of a pen
which can beset to draw or rubou
t using the   0 key"
 860 PRINT '"Select options 1,7
or 8 when theprogram is first RU
N.": GO SUB 5000
 870 GO TO menu
1100 REM Old Character
1110 IF NOT new THEN GO TO 3000
1120 GO TO 4000
1400 REM Display Character
1410 IF NOT new THEN GO TO 3000
1420 BORDER 6: CLS : PRINT AT 2,
5; BRIGHT b;"Display the Charact
er"
1430 GO SUB 5100
1440 FOR i=5 TO 21 STEP 8
1450 PRINT AT 11,i;"ABCD";AT 12,
i;"EFGH";AT 13,i;"IJKL"
1460 NEXT i
1470 GO SUB 5000
1480 GO TO menu
1700 REM Display Numbers
1710 IF NOT new THEN GO TO 3000
1720 CLS : PRINT AT 2,8; BRIGHT
b;"Display Numbers"
1730 PRINT '''"The numbers are pr
inted in four columns and repres
ent the         following Graphics
 Characters :"
1740 PRINT '''"The first 8 rows a
re: A  B  C  DThe next  8 rows a
re: E  F  G  HThe last  8 rows a
re: I  J  K  L"
1750 PRINT '''"Once the numbers a
re displayed  press any key to c
ontinue."
1760 GO SUB 5000
1770 CLS : FOR i=b TO 24
1780 FOR j=b TO 25 STEP 8
1790 IF i<23 THEN PRINT AT i-b,j
+2;c(i,(j+7)/8)
1800 IF i>22 THEN PRINT #0;AT i-
23,j+2;c(i,(j+7)/8)
1810 NEXT j: NEXT i
1820 PAUSE 0
1830 GO TO menu
2000 REM Save the Chr
2010 IF NOT new THEN GO TO 3000
2020 BORDER 5: CLS : PRINT AT 2,
6; BRIGHT b;"Save the Character"
2030 INPUT "Enter the Name (max
10 letters) ";n$
2040 PRINT AT 11,6; BRIGHT b;"Sa
ving  ";n$
2050 SAVE n$CODE USR "a",96
2060 BORDER 4: PRINT AT 13,6; PA
PER 4;"  Stop the tape   "
2070 GO SUB 5000
```

Program 1.

continued from page 165

the **Horizons** tape in the form of "character" which is also a graphics character generating program. In that case only one screen display is used with the menu occupying the lower portion of the screen. Options are selected by pressing the appropriate letter keys.

Before describing Program 1 it is worthwhile looking at some general practices which can be adopted when writing any program. Those result in the program lines 10 to 150 and are arranged as follows. Lines 10 to 30 are REM lines which contain the title, and a copyright notice enabling the program to be easily identified by the first few lines. Frequently used numbers are assigned to variables in line 40. The screen colours are established in line 50 whilst all the arrays are DIMensioned in lines 60 and 70. The POKE in line 100 is a useful means of setting CAPS LOCK on.

Lines 120 to 130 read in the necessary data for the user defined graphics and array d< > with line 110 reminding you where to find the first data line. Line 140 contains a frequently used message which is held in w$.

The most commonly used GO TO statement, at the end of each option section, refers to the start of the Main menu. To assist in identifying those the variable 'menu' is set equal to 200, which is then treated as a line number in the statement 'GO TO menu'.

The variable 'new' in line 40 is used to detect if a character has been generated and prevents you using options 4, 5 or 6 before you have selected 1, 7 or 8.

new: detects if the data associated with the program has been changed. 0 = no, 1 = yes.
a = 0, b = 1, e = 7: these frequently used numbers are stored in variables which are then used in place of the numbers to save memory.
menu = 200 (defines the line number 200).
n$(10) contains the name of the character (used in LOAD/SAVE to tape).
i$** and **s$ are frequently used questions.
c$(32) used to blank out a full line on the screen.
i, j, lim are temporary variables.
w = address of the bytes for the character selected in ROM.
t = address of the graphic character in the data.
xsize and **ysize** define the magnification of the character printed by the subroutine at line 7000.
xpos and **ypos** are the x and y coordinates of the character printed by the subroutine at line 7000.

Table 2. Variables for Program 2.

Now to the main program section which contains the menu. That occupies lines 200 to 390 and starts with a REM line to identify the section. It is good practice to use as many REM lines as possible when writing a program to make it easier for others to understand. The fully developed program was written to run on a 16K Spectrum which still has enough memory to support an adequate number of REM lines.

You will notice the use of the PRINT AT function in all the following lines in order to produce a screen display which is both tidy and easy to understand. Whenever I write a program containing screen displays I always sit down with a 32 by 24 grid representing the full screen and plan the layout with a pencil and rubber before attempting to write any program lines.

```
  10 REM    Alphabet Learner
  20 REM  ©  A. Pratt  1984
  30 REM
  40 CLEAR 30099: LOAD ""CODE : BEEP 1,12
  50 LET a=0: LET new=a: LET b=1 : LET e=7
  60 PAPER e: INK a: BORDER e: BRIGHT a
  70 DIM n$(10): DIM c$(32): POKE 23658,8
  80 LET i$=" Select a Letter ? "
  90 LET s$="Select your option"
 100 LET menu=200
 200 REM Menu
 210 BRIGHT a: BORDER e: CLS : PRINT INK e; PAPER b; BRIGHT b;"      ALPHABET LEARNER       "
 220 FOR i=b TO 3: BEEP .03,3: BEEP .06,b: NEXT i
 230 PRINT AT 8,e; BRIGHT 1;s$
 240 PRINT AT 11,e;"Instructions"
 250 PRINT AT 13,e;"Learn by Pictures"
 260 PRINT AT 15,e;"Examine old Pictures"
 270 PRINT AT 17,e;"Load in new Pictures"
 280 PRINT AT 19,e;"End the program"
 290 LET j=11: LET lim=6: GO SUB 4300
 400 REM Sort out choice
 410 GO TO i*500
 500 REM Instructions
 510 CLS : PRINT AT a,9; BRIGHT b;" Instructions "
 520 PRINT ''"'ALPHA' is a teaching program tohelp young children learn the   letters of the Alphabet."
 530 PRINT ''"Select option 2 to obtain a       large version of any letter withan associated picture."
 540 PRINT ''"The pictures are drawn with the help of the program 'BIG GEN'  and then loaded into 'ALPHA' by selecting option 4."
 550 PRINT ''"Whenever new pictu
```

Program 2.

Following the title and the instruction 'Select your option' which are both highlighted, the various options are spelt out in short titles which are intended to be self explanatory. As with all good menu programs there is a choice titled 'Instructions' which will enable the first time user to understand

```
2080 GO TO menu
2300 REM Use Saved Chr
2310 BORDER 5: CLS : PRINT AT 2,5; BRIGHT b;"Use a saved Character"
2320>INPUT "Enter the Name (max 10 letters) ";n$
2330 PRINT AT 11,6; BRIGHT b;" Loading ";n$
2340 PRINT AT 13,6; INK 2; FLASH b;"    Start the tape     "
2350 LOAD n$CODE USR "a"
2360 BORDER 4: PRINT AT 11,6; BRIGHT b;"  ";n$;" loaded "
2370 PRINT AT 13,6; PAPER 4;" Stop the tape    "
2380 PRINT AT 15,a;"          "; BRIGHT b;w$
2390 REM Fill c()
2400 LET m=a
2410 FOR k=a TO 16 STEP 8
2420 FOR i=b TO 4: FOR j=b TO 8
2430 LET c(j+k,i)=PEEK (USR "a"+m)
2440 LET m=m+1
2450 NEXT j: NEXT i: NEXT k
2460 REM Fill a$()
2470 FOR i=b TO 24: PRINT AT e,15;i: FOR j=b TO 4
2480 LET t=c(i,j): LET t$="00000000"
2490 FOR k=b TO 8
2500 IF t>=d(k) THEN LET t$(k)="1": LET t=t-d(k)
2510 NEXT k
2520 LET a$(i,j*8-7 TO j*8)=t$
2530 NEXT j: NEXT i
2540 PRINT AT 15,9;c$
2550 GO SUB 5100: LET new=b
2560 GO SUB 5000
2570 GO TO menu
2600 REM Use existing chrs
2610 BORDER 6: CLS : PRINT AT 2,3; BRIGHT b;"Use existing Graphic Characters    A,B,C,D  E,F,G,H  I,J,K,L  "
2620 GO TO 2380
2900 REM End
2910 BORDER 4: CLS : PRINT AT 2,10; BRIGHT b;"  THE END  ";AT 15,10;"BYE FOR NOW"
2920 GO SUB 5100
2930 STOP
3000 REM Error
3010 BORDER 2: CLS : PRINT AT 10,b; BRIGHT b;"There is no existing character"
3020 PRINT AT 15,5; BRIGHT b;"Refer to Instructions"
3030 GO SUB 5000
3040 GO TO menu
4000 REM Redraw
4010 CLS
4020 FOR i=b TO 22
4030 FOR j=b TO 32
4040 IF a$(i,j)="0" THEN PRINT "S";
4050 IF a$(i,j)="1" THEN PRINT "T";
4060 NEXT j: NEXT i
4070 FOR i=23 TO 24
4080 FOR j=b TO 32
4090 IF a$(i,j)="0" THEN PRINT #0;AT i-23,j-1;"S";
4100 IF a$(i,j)="1" THEN PRINT #0;AT i-23,j-1;"T";
4110 NEXT j: NEXT i
4200 REM Reset variables
4210 LET r=a: LET c=r: LET p=-1
4220 LET r1=r: LET c1=r: LET out=r
4230 GO TO 4460
4250 REM Loop
4260 PAUSE VAL "2"
4270 IF INKEY$="C" THEN LET out=1: GO TO 4390
4280 LET q=IN 63486: LET w=IN 61438
4290 IF q<192 THEN LET q=q+64
4300 IF w<192 THEN LET w=w+64
4310 IF w/2-INT (w/2)=a THEN LET p=-p: FOR i=b TO e: NEXT i: GO TO 4450
4320 IF q=255 AND w>253 THEN GO TO 4250
4340 IF q<255 AND c<>a THEN LET c1=c-b
4350 IF (w=251 OR w=243 OR w=235) AND c<>31 THEN LET c1=c+b
4360 IF (w=239 OR w=235) AND r<>23 THEN LET r1=r+b
4370 IF (w=247 OR w=243) AND r<>0 THEN LET r1=r-b
4390 REM Set array
4400 IF r<22 THEN PRINT AT r,c;i$
4410 IF r>21 THEN PRINT #0;AT r-22,c;i$
4420 LET a$(r+1,c+1)="0"
4430 IF p=b THEN LET a$(r+1,c+1)="1"
4440 LET r=r1: LET c=c1
4450 IF out THEN GO TO 4500
4460 LET i$="S": IF p=b THEN LET i$="T"
4470 IF r<22 THEN PRINT AT r,c; BRIGHT 1;i$; OVER b;CHR$ 8+"+"
4480 IF r>21 THEN PRINT #0;AT r-22,c; BRIGHT b;i$; OVER b;CHR$ 8+"+"
4490 GO TO 4250
4500 REM Calculate
4520 BORDER 5: PRINT AT 11,10; BRIGHT b; FLASH b;" CALCULATING "
4530 FOR i=b TO 24
4540 FOR j=b TO 25 STEP 8
4550 LET c(i,(j+7)/8)=VAL ("BIN "+a$(i,j TO j+7))
4560 NEXT j: NEXT i
4600 REM Fill Graphics
4610 LET m=a
4620 FOR k=a TO 16 STEP 8
4640 FOR i=b TO 4
4650 FOR j=b TO 8
4660 POKE USR "a"+m,c(j+k,i)
4670 LET m=m+b
4680 NEXT j: NEXT i: NEXT k
4690 GO TO 1400
5000 PRINT #0;AT b,3; FLASH b;"Press any key to continue": PAUSE 0
5010 RETURN
5100 FOR i=5 TO 21 STEP 4
5110 PRINT AT 7,i;"ABCD";AT 8,i;"EFGH";AT 9,i;"IJKL"
5120 NEXT i
5140 RETURN
6000 DATA "128","128","128","128","128","128","128","255"
6010 DATA "127","127","127","127","127","127","127","0"
6020 DATA 128,64,32,16,8,4,2,1
7000 REM Save program
7010 SAVE "BIG GEN"
7020 BEEP 1,12: STOP
```

```
res are loadedyou will be asked
to re-record  this program."
 990 GO SUB 5000: GO TO menu
1000 REM Learn
1010 CLS : PRINT AT a,6; BRIGHT
b;" Learn by Pictures "
1030 GO SUB 4400
1110 BRIGHT b: CLS : INK 2
1130 LET w=15360+i*8
1140 LET lim=a: LET xpos=77: LET
 ypos=167
1150 LET xsize=9: LET ysize=xsiz
e
1160 GO SUB 7000: INK 4
1230 LET w=15360+(i+32)*8
1240 LET xpos=93: LET ypos=79
1260 GO SUB 7000: INK 5
1300 PRINT INK a;AT 5,12;"is for
"
1330 LET w=(i-65)*96+30100
1340 LET lim=11: LET xpos=152: L
ET ypos=79
1350 LET xsize=3: LET ysize=xsiz
e
1360 GO SUB 7000
1400 LET t=30100+(i-65)*96
1410 GO SUB 4100: INK b
1440 FOR i=2 TO 6 STEP 4
1450>PRINT AT i,21;"ABCD  ABCD";
AT b+i,21;"EFGH  EFGH";AT 2+i,21
;"IJKL  IJKL"
1460 NEXT i: INK a
1480 GO SUB 5000: GO TO menu
1500 REM Examine
1510 BORDER 5: CLS : PRINT AT b,
6; BRIGHT b;"Examine old Picture
s"
1520 PRINT AT 4,2;"Examine the p
resent pictures    associated wi
th the letters."
1550 PRINT AT 8,e; BRIGHT b;s$
1560 PRINT AT 11,e;"Examine old
picture"
1580 PRINT AT 13,e;"Return to ma
in menu"
1600 LET j=11: LET lim=3: GO SUB
 4300
1650 IF i=2 THEN GO TO menu
1700 CLS : PRINT AT e,8; BRIGHT
b;"Present Picture"
1710 GO SUB 4400
1740 LET t=30100+(i-65)*96
1750 PRINT AT 15,a;c$: GO SUB 41
00
1770 PRINT BRIGHT b;AT 10,14;"AB
CD";AT 11,14;"EFGH";AT 12,14;"IJ
KL"
1790 GO SUB 5000: GO TO 1510
2000 REM Load
2010 BORDER 6: CLS : PRINT AT b,
6; BRIGHT b;"Load in New Picture
s"
2020 PRINT AT 4,2;"Change the ex
isting pictures    associated wi
th the letters."
2050 PRINT AT 8,e; BRIGHT b;s$
2060 PRINT AT 11,e;"Load new pic
ture"
2080 PRINT AT 13,e;"Return to ma
in menu"
2100 LET j=11: LET lim=3: GO SUB
 4300
2150 IF i=2 THEN GO TO menu
2190 LET new=b
2200 CLS : PRINT AT e,8; BRIGHT
1;"Load New Picture"
2210 INPUT "Name of new picture
?",n$
2220 PRINT BRIGHT b;AT 10,e;"Loa
ding ";n$
2230 PRINT INK 2; FLASH b;AT 12,
e;"  Start the tape  "
2240 LOAD n$CODE USR "a"
2250 PRINT AT 10,a;c$;AT 14,a;"
"
2260 PRINT PAPER 4;AT 12,e;"  St
op the tape  "
2270 LET t=30100+(CODE n$(1)-65)
*96: GO SUB 4000
2280 PRINT AT 12,a;c$; BRIGHT b;
AT 10,14;"ABCD";AT 11,14;"EFGH";
AT 12,14;"IJKL"
2290 GO SUB 5000: GO TO 2010
2500 REM End
2510 IF new THEN GO TO 8000
2520 BORDER 4: CLS : PRINT AT 10
,10; BRIGHT b;"  THE END  "
2540 PRINT AT 15,10; BRIGHT b;"B
YE FOR NOW"
2550 STOP
4000 REM Transfer 1
4010 FOR i=a TO 95
4020 POKE (i+t),PEEK (USR "a"+i)
4030 NEXT i: RETURN
4100 REM Transfer 2
4110 FOR i=a TO 95
4120 POKE (USR "a"+i),PEEK (i+t)
4130 NEXT i: RETURN
4300 REM Input 1
4310 LET i=CODE INKEY$-48: IF i>
0 AND i<lim THEN RETURN
4320 PRINT INK a;AT j,2;(j-9)/2
4330 LET j=j+2: IF j=lim*2+9 THE
N LET j=11
4340 PRINT INK e;AT j,2;(j-9)/2
4350 GO TO 4310
4400 REM Input 2
4410 LET j=b: PRINT AT 15,6;i$
4420 LET i=CODE INKEY$: IF i>64
AND i<91 THEN RETURN
4430 PRINT BRIGHT b;AT 15,j+5;i$
(j)
4440 LET j=j+b: IF j=20 THEN LET
 j=b
4450 PRINT AT 15,j+5;i$(j)
4460 GO TO 4420
5000 PRINT #0;AT b,3; FLASH b;"P
ress any key to continue": PAUSE
 0
5010 RETURN
7000 REM Big Print
7010 FOR d=a TO lim
7020 FOR q=a TO e
7030 LET val=PEEK (w+d*8+q)
7040 FOR z=a TO e
7050 IF val-2*INT (val/2) THEN F
OR t=b TO ysize: PLOT xpos-z*xsi
ze,ypos-q*ysize-t: DRAW b-xsize,
a: NEXT t
7060 LET val=INT (val/2)
7070 NEXT z: NEXT q
7080 LET xpos=xpos+xsize*8
7090 IF d=3 OR d=7 THEN LET xpos
=152: LET ypos=ypos-ysize*8
7100 NEXT d
7110 RETURN
8000 REM Save program
8010 CLS : PRINT AT 10,0; BRIGHT
 1;"The program must be re-recor
ded."
8020 SAVE "ALPHA" LINE 10: BEEP
1,12
8030 SAVE "Alphacode"CODE 30100,
2496: BEEP 1,14: STOP
```

how to use the program.

The final choice allows the user to stop the program without reverting to using the BREAK key or pulling the plug out.

After printing all the titles the program needs to identify each option. In this case the numbers 1 to 9 are printed down the left hand side. That is done with lines 360 to 380 which may appear complicated but the effect produced is of a flashing band travelling quickly down the numbers and reminds the user the machine is waiting for a choice to be made.

Line 390 completes the program loop which is another essential part of a menu program. The lines 350 to 390 are repeated endlessly until a valid key is pressed which identifies a menu option. Line 350 is used to detect when that happens by looking at the contents of INKEY$.

In Appendix A of the Spectrum Manual is the ASCII table which gives the code for each character. The codes for the numbers start at 48 and go to 57, hence by subtracting 48 from CODE INKEY$ a number corresponding to the key pressed is obtained. That is then tested to see if it falls within the range of the options, in this case 1 to 9, and if it does the machine jumps to line 400. Line 410 directs the machine to the correct program section using the Spectrum capability of GO TO a variable — or in this case a formula using a variable — which is treated as a line number.

Type in the program lines 10 to 410 and 6000 to 6020 and save them on tape. RUN the program and you will obtain the menu on the screen with the numbers on the left flickering in sequence. Try pressing any key except the numbers 1 to 9 and nothing should happen. Now press a number between 1 and 9 and the report 0 OK, 6020:1 should appear. If it does not you can correct your mistakes and RUN the program as many times as you like until it does what it is supposed to do. As all programmers realise writing a program may seem easy but getting it to work and do what you intend is something completely different. By allowing the program to be broken into separate sections the whole program need not be written at once.

The menu section is relatively easy to write and you can copy lines 100 to 410 of this program with changes to the titles for your own menu program.

Although each option section is ideally independent of all the others, there are always some routines which are used by two or more sections. The best example in Program 1 is the routine which returns the machine to the Main menu and consists of a subroutine at line 5000. In general all common routines should be separated from the option sections and written as subroutines near the end of the program.

As well as using subroutines the program also contains two routines which are used by two option sections but are entered at different points by each section. The first of those has been taken out of the option section and located between lines 4000 and 4690. That is the main drawing routine and is itself separated into sections by REM lines which identify entry points. It also contains its own subroutine at line 4600 which changes the characters in a$. The array represents the full character using '0' for an empty square and '1' for a filled in square. The drawing loop, lines 4250 to 4490, is repeated until the character is complete and key 'C' is pressed.

The second routine is associated with using either a SAVEd character or the existing graphic characters USR "A" to USR "L". It contains two routines for filling the arrays c< > and a$< > and is located within the section associated with option 7. The other option, 8, enters the routine at line 2380.

When developing the program the drawing routine was written after the main menu section. To check its operation it was necessary to include an option section to access it. When developing your own menu program you will probably follow the technique adopted of writing each option section and then testing it before proceeding with the next. Rather than use that approach now, type in the whole of the remainder of the program. Note the letters S and T in lines 680, 4050, 4090, 4100 and 4460, and letters A to L in lines 1450 and 5110 are graphics characters.

Once complete RUN the program again and press key 2. That will pro-

continued on page 168

continued from page 167

duce a set of instructions to enable you to use the program. Option 9 will allow you to stop the program and correct any mistakes in options 2 and 9 before continuing. Once you are happy RUN again and select options 4, 5 and 6 in turn. In each case you should be told to select options 1, 7 or 8 first since the variable 'new' = 0.

Now select option 1 to test the drawing routine. After initialising a set of instructions will be displayed. Memorise those and then press a letter key. The screen will now fill with a grid of black lines defining 32 by 24 squares with the top left square highlighted containing the '+' symbol. That is the tip of the drawing pen. Check the operation of the '0' and cursor keys to draw a shape before pressing the C key. After calculating the program will automatically select option 4 and display three of the characters full size and a further five joined together.

Once options 1 and 4 work properly select option 3 and your character will be reconstructed on the full screen line by line. The keys used in option 1 again become operative and you may modify the character and view it full size before returning to the menu. Now select option 5 which produces its own instructions followed by a list of the numbers.

The options 6 and 7 allow you to save a character on tape — by saving the graphic characters USR "A" to USR "L"+7 — and recall a character from tape. Generate a character using option 1 and then select option 6. You will be asked for a name which is entered in capital letters automatically — do not change the cursor to lower case letters. Instructions will be given on starting and stopping the tape and I suggest you record the characters on the second side.

Now select option 7 and enter the same name you used in section 6. Rewind the tape and again follow the instructions on the screen. Once loaded the machine uses two routines to fill the arrays. Lines 2390 to 2450 are used to fill c< > and lines 2460 to 2530 use a relatively quick method to convert the numbers from array c< > into binary and insert the result in a$< >.

The last option, 8, allows you to use the existing graphics characters A to L. It is intended to be chosen instead of option 1 when the program is first RUN and allows you to use characters from another program which are preserved when NEW is used to delete that program.

Once you are happy with the program and all the mistakes are corrected type RUN 7000 and press ENTER. The routine in lines 7000 to 7020 has been included to automatically SAVE the program for you.

One final word of explanation; you will notice extensive use of PRINT 0 in this program. That allows printing on the two lines of the screen normally reserved for input and messages, enabling a grid of 24 lines to be drawn.

```
  BIG GRAPHICS GENERATOR
      Select your option
1     Draw a New Character
2     Instructions
3     Redraw Existing Character
4     Display the Character
5     Display the Numbers
6     Save the Character
7     Use a Saved Character
8     Use Graphics A to L
9     End the program

   Display the Character
```



Program 2 is an educational program which illustrates the letters of the alphabet with graphic characters. If you have used Program 1 to generate and save some characters on tape, you will be able to load those characters into a block of data associated with this alphabet learner program.

You will recognize the initialisation and title section in lines 10 to 100. Line 40 contains CLEAR and LOAD statements which allow the data associated with the graphics characters to be held in memory from location 30100 onwards. The saved program will automatically RUN itself when loaded and all the data is then loaded as a single block of numbers.

The main menu is located from lines 200 to 290 with the options listed in lines 240 to 280. It is similar in layout to the menu in Program 1 and could be adapted to any requirement simply by changing the words. Line 290 contains a GOSUB 4300 statement which handles the INPUT of a valid option number. The reason for using a subroutine is because two of the main menu options also contain their own menus hence a common routine can be used. Remember that any common routines should be separated out as subroutines and placed near the end of the program. The variable 'j' is set to the row number containing the first option and 'lim' is the number of options.

Each menu option is defined by a REM statement as are the subroutines at the end. Once again the program will fit in the 16K Spectrum.

For those of you who do not have any characters saved on tape a load program is included in Program 3 which will illustrate the letters A to D. It is limited to letter D since a longer listing would be laborious to type in and there is more enjoyment to be had in creating your own characters. This program should be typed in before Program 2 and RUN. Once complete type NEW which will delete the program but preserve the numbers in high memory.

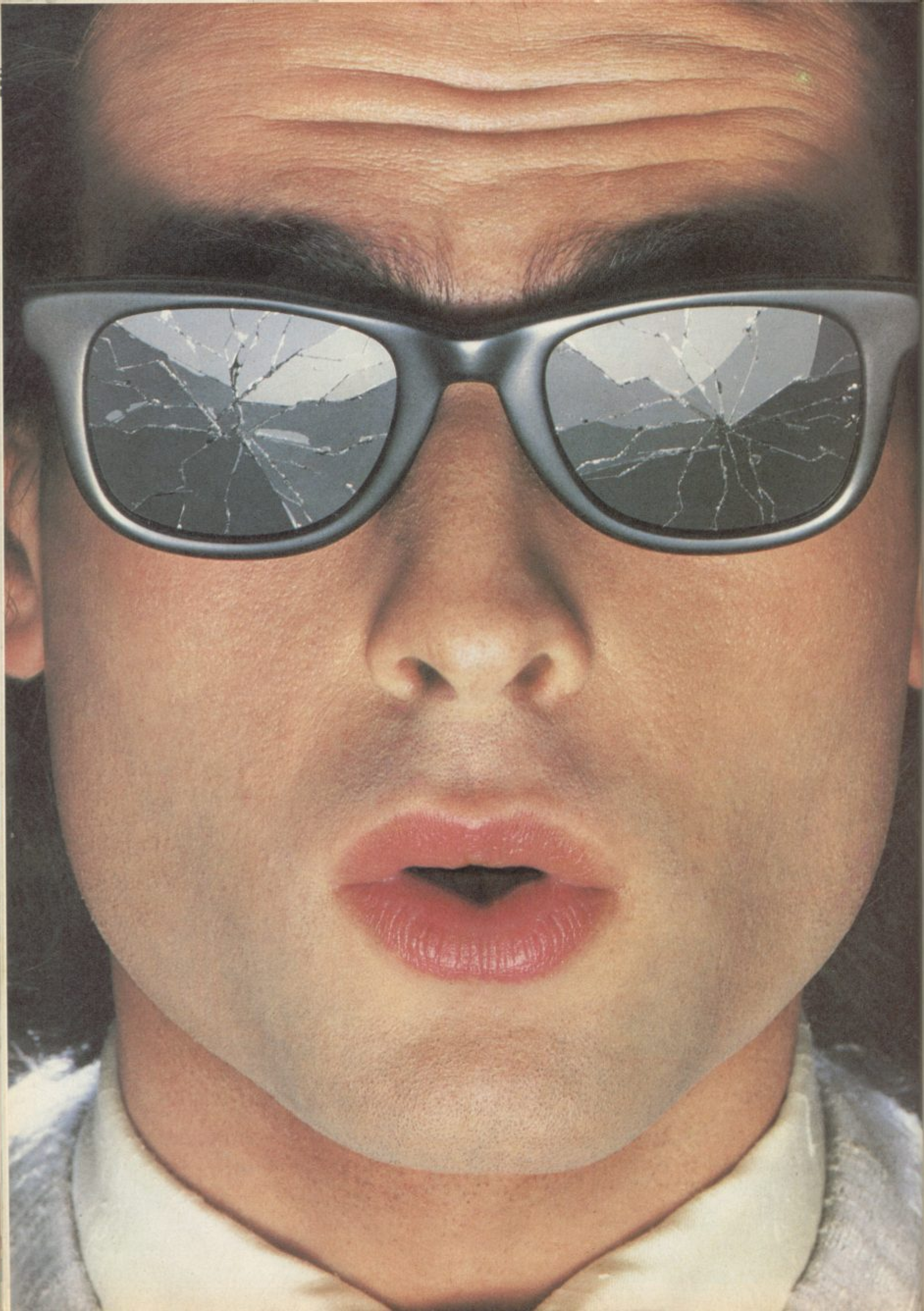
If you do not wish to use the loader program you should type CLEAR 30099 and press ENTER. Now type in the program "ALPHA" listing in Fig 2. Note the letters A to L in lines 1450, 1770 and 2280 are graphics characters. Once you have corrected any mistakes type GO TO 8000 and follow the instructions for saving the program and then the data. After VERIFYing the tape copy type RANDOMIZE USR 0 to reset the Spectrum. Now type LOAD "ALPHA" and load in the program.

Once loaded the main menu will appear and I suggest you select option 1 first. Now you can load all those characters you saved on tape and begin to teach your children the Sinclair character set.

```
  10 REM     Data Loader
  20 REM  ©  A. Pratt 1984
  30 REM
  40 CLEAR 30099
  50 FOR i=30100 TO 30483
  60 READ val: POKE i,val
  70 NEXT i
  80 STOP
 100 DATA 0,0,0,0,0,0,0,1,96,48,
27,12,7,6,115,251,60,199,26,100,
156,124,0,56,0,0,128,128,0,0,0,0
 110 DATA 3,7,7,15,15,31,31,31,2
53,255,255,255,255,255,255,255,1
90,255,255,255,255,255,255,255,0
,0,0,128,128,192,192,192
 120 DATA 15,15,7,7,3,1,0,0,255,
255,255,255,255,255,125,24,255,2
55,255,255,254,252,240,192,128,1
28,0,0,0,0,0,0
 130 DATA 0,0,31,63,98,98,98,98,
0,0,255,255,8,105,105,40,0,0,255
,255,32,160,160,160,0,0,248,252,
134,134,134,134
 140 DATA 127,127,127,127,127,66
,78,110,255,255,255,255,255,8,10
4,104,255,255,255,255,255,32,38,
38,254,254,254,254,254,146,146,1
46
 150 DATA 86,127,123,119,111,111
,7,3,40,255,127,184,216,223,128,
0,34,255,253,59,55,247,3,1,146,2
42,178,210,234,238,192,128
 160 DATA 4,14,15,7,5,4,4,4,0,0,
0,128,192,224,112,92,0,0,0,0,0,0
,0,0,0,0,0,0,0,0,0,0
 170 DATA 4,4,4,4,4,4,14,4,42,21
,10,5,2,2,1,0,0,128,128,64,160,8
7,47,156,0,32,32,32,32,248,248,1
27
 180 DATA 2,2,10,4,0,0,0,0,0,0,0
,0,0,0,0,0,79,61,31,15,21,40,26,
15,127,127,248,252,86,5,170,252
 190 DATA 4,61,132,143,252,165,3
6,62,16,240,144,120,192,120,7,63
,0,0,0,0,0,0,248,255,0,0,0,0,0,0
,0,192
 200 DATA 63,121,121,127,127,63,
62,25,127,159,239,247,55,143,127
,255,255,255,255,254,253,251,251
,229,248,252,254,255,253,249,249
,249
 210 DATA 7,6,12,24,16,24,12,0,2
43,224,96,32,32,32,32,96,134,6,6
,4,4,8,8,24,249,112,48,16,16,16,
16,48
```

Program 3.


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Alison Maguire is the force guiding Sinclair's software strategy. Theo Wood discovers the principles that lie behind the product.

The games Sinclair plays

Alison Maguire is one of the more successful women in the computer industry, and as software director for Sinclair Research has seen her department grow from scratch to worldwide proportions in the two years since she joined.

Things were very different on the software scene then, back in January 1983. The Spectrum had been on the market for seven months and Sinclair had been involved in software at a marginal level only, with very few titles available. People who bought Spectrums around that time will remember only too well the level of software provision — certainly nothing in comparison to what is available today.

What, then, are her main considerations as software director? "I'm basically concerned with software publishing but in fact there is an overall responsibility to ensure that our hardware doesn't fail to sell for lack of software. At one end of our involvement we have a commitment to software for its own sake. At the other end we encourage companies to develop software which we might not sell ourselves, but which would make the hardware more attractive to a particular market."

To begin with the Sinclair involvement with software was limited to obtaining a licence to market software which was already being sold.

On arriving at Sinclair Research Maguire concentrated on familiarising herself with the Spectrum and the ZX-81, as well as the various titles which were available. Her main task was to take account of the market and the products and then to define a software strategy, although as she says, "It's very difficult to define an overall software strategy as we are really a hardware manufacturer. For example, when it comes to deciding to bundle software, I lose part of my product line, but if we sell another 50,000 computers because of it then it's very worthwhile."

The QL is the first computer which has seen activity on the software front from inception, exemplified by the inclusion of the Psion packages in the hardware product. "Since the launch in January, about 300 companies have written to us, asking for a variety of assistance with both the development of software and peripherals. That puts us in a very nice position for identifying products we are interested in."

That also generates feedback of ideas and Maguire's department is in the front line of liaison between the labs and the various companies who apply for assistance. Those companies provided an early testing ground for the QL, and indeed some were paid to do that work. Such an arrangement is an advantage in that any bugs which might exist can be eliminated at an early stage with full cooperation between the labs and the software house concerned.

Since the early days things have changed a great deal. Maguire now oversees a department comprising of two editors, a software engineer, two secretarial/PA people and a software product manager responsible for marketing and to a certain extent production as well.

''People in Britain don't want to be educated at home. Most parents want to buy something that amuses their children.''

"This size of team is pretty new; in June 1984 I had only a secretary. There is now a greater commitment to software. The aim is to go into software publishing for the QL and to take advantage of the fact that we are the hardware manufacturer."

Although almost half the Spectrum sales are overseas, the Spectrum+ will have a further impact on those markets. The new user guide will have been translated into 19 languages by Christmas 1984 and software sales will presumably follow hardware. How does Sinclair Research intend to take advantage of that?

"There are various ways in which we are tackling it. Wherever we've got a new branch office — as in Germany, Italy or France — we have local software managers already appointed. I will meet them regularly so we have information flowing back and forth. We are looking at a variety of arrangements for getting English software translated, though it's not always appropriate to translate software."

In recent months large foreign publishing companies have approached Sinclair as to distribution rights. If local branch offices agree Sinclair may deal direct especially if the company has a sound background. "Up until now it's been only titles in our catalogue for which we have discussed foreign rights. There hasn't been anyone who has had the time to think carefully about foreign rights, because we have been so busy setting up the new department and the QL. We are now thinking about it and it's occurred to me that as with the expansion pack, which is totally non-Sinclair, it may be time to offer non-Sinclair suppliers a chance to get at our distributors. I'm considering ways to invite people to do so. In some foreign markets it is very difficult to make money out of software but we still need it to be there. If we can provide an easy route for the software to be there legally then we will make it less easy for the pirates."

There has been a lot of talk about the education market overtaking the games market. "Last year we were talking about schools and the DoI scheme, in which the Spectrum was involved. We published some titles in association with Macmillan and I wanted Sinclair to be involved with a respected long-standing name in education because I thought we were viewed possibly as fly-by-nights.

"However, that market has been disappointing. I think that whether or not all the educationalists would like it, educational software has not sold well. People in Britain don't want to be educated at home, unlike in the States. The idea was ahead of its time, but it may happen soon because educational software now is more entertaining than before. The difficulty is deciding who are you selling to, parents or children. Most parents are indulgent and want to buy something that amuses their children."

Edutainment? "I loath that word. Although the extraordinary thing is I sometimes wonder whether our view, as adults, about what children should enjoy, is wrong."

Maguire was recently sent a program which was a simulation of property dealing and rent management and her two daughters of nine and 11 spent a whole day playing with it.

"They said it was the best program they had ever played, and at the end of that time they knew what a balance sheet was and something about the relationship between managing people and making profits. I was amazed at this; it wasn't the zap-it-up game which they usually like. Nevertheless it's difficult to sell that type of game to retailers."

What does she feel about the current image of computers, dominated by games which appeal mostly to boys?

continued on page 176

See Micronet 800 in action.

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Watford. SRS Microsystems, 94 The Parade, High Street. Tel: 0923 26602.
Watford. Trewins, Queens Road. Tel: 0923 44266.
Welwyn Garden City. DJ Computers, 40 Fretherne Road. Tel: 96 28444.
Welwyn Garden City. Welwyn Department Store. Tel: 0707 323456.

HUMBERSIDE

Beverley. Computing World, 10 Swabys Yard, Dyer Lane. Tel: 0482 881831.

KENT

Beckenham. Supa Computers, 425 Croydon Road. Tel: 01-650 3569.
Bexleyheath. Laskys, 15-16 Broadway Shopping Centre. Tel: 01-301 3478.
Bromley. Boots, 148-154 High Street. Tel: 01-460 6688.
Bromley. Computers Today, 31 Market Square. Tel: 01-290 5652.
Bromley. Laskys, 22 Market Square. Tel: 01-464 7829.
Bromley. Walters Computers, Army & Navy, 64 High Street. Tel: 01-460 9991.
Chatham. Boots, 30-34 Wilmott Square, Pentagon Centre. Tel: 0634 405471.
Sevenoaks. Ernest Fielder Computers, Dorset Street. Tel: 0732 456800.
Sittingbourne. Computer Plus, 65 High Street. Tel: 0795 25677.
Tunbridge Wells. Modata Computer Centre, 28-30 St Johns Road. Tel: 0892 41555.

LANCASHIRE

Blackburn. Tempo Computers, 9 Railway Road. Tel: 0254 691333.
Blackpool. Blackpool Computer Store, 179 Church Street. Tel: 0253 20239.
Burnley. IMO Business Systems, 39-43 Standish Street. Tel: 0282 54299.
Preston. 4Mat Computing, 67 Friargate. Tel: 0772 561952.
Preston. Laskys, 1-4 Guildhall Arcade. Tel: 0772 24558.
Wigan. Wildings Computer Centre, 11 Mesnes Street. Tel: 0942 44382.

LEICESTERSHIRE

Leicester. Boots, 30-36 Gallowtree Gate. Tel: 0533 21641.
Market Harborough. Harborough Home Computers, 7 Church Street. Tel: 0858 63056.

LONDON

W1. Computers of Wigmore Street, 104 Wigmore Street. Tel: 01-486 0373.
W1. HMV, 363 Oxford Street. Tel: 01-629 1240.
W1. John Lewis, Oxford Street. Tel: 01-629 7711.
W1. Laskys, 42 Tottenham Court Road. Tel: 01-636 0845.
W1. Lion House, 227 Tottenham Court Road. Tel: 01-637 1601.
W1. Rother Cameras, 256 Tottenham Court Road Tel: 01-580 5826.
W1. The Video Shop, 18 Tottenham Court Road. Tel: 01-580 5380.
W1. Walters Computers, DH Evans, Oxford Street. Tel: 01-629 8800.
WC1. Transam Micro Systems, 59-61 Theobalds Road. Tel: 01-405 5240.
W5. Laskys, 18-19 Ealing Broadway Shopping Centre. Tel: 01-567 4717.
W8. Walters Computers, Barkers, Kensington High Street. Tel: 01-937 5432.
SW1. Peter Jones, Sloane Square. Tel: 01-730 3434.
SE9. Square Deal, 373-375 Footscray Road, New Eltham. Tel: 01-859 1516.
Lewisham. Laskys, 164 High Street. Tel: 01-852 1375.
SE13. Walters Computers, Army & Navy, 33 and 63 High Street, Lewisham. Tel: 01-852 4321.
SE15. Castlehurst Ltd, 152 Rye Lane, Peckham. Tel: 01-639 2205.
EC2. Devron Computer Centre, 155 Moorgate. Tel: 01-638 3339.
N7. Jones Brothers, Holloway Road. Tel: 01-607 2727.
N14. Logic Sales, 19 The Bourne, The Broadway, Southgate. Tel: 01-882 4942.
NW3. Maycraft Micros, 58 Rosslyn Hill, Hampstead. Tel: 01-431 1300.
NW4. Davinci Computer Store, 112 Brent Street, Hendon. Tel: 01-202 2272.
NW7. Computers Inc, 86 Golders Green. Tel: 01-209 0401.
NW10. Technomatic, 17 Burnley Road, Wembley. Tel: 01-208 1177.

MANCHESTER

Manchester. Boots, 32 Market Street. Tel: 061-832 6533.
Manchester. Laskys, 61 Arndale Centre. Tel: 061-833 9149.
Manchester. Laskys, 12-14 St Marys Gate. Tel: 061-833 0268.
Manchester. Mighty Micro, Sherwood Centre, 268 Wilmslow Road, Fallowfield. Tel: 061-224 8117.
Manchester. NSC Computer Shops, 29 Hanging Ditch. Tel: 061-832 2269.
Oldham. Home & Business Computers, 54 Yorkshire Street. Tel: 061-633 1608.
Swinton. Mr Micro, 69 Partington Lane. Tel: 061-728 2282.

MERSEYSIDE

Heswall. Thornguard Computer Systems, 46 Pensby Road. Tel: 051-342 7516.
Liverpool. George Henry Lee, Basnett Street. Tel: 051-709 7070.
Liverpool. Hargreaves, 31-37 Warbreck Moor, Walton. Tel: 051-525 1782.
Liverpool. Laskys, Dale Street. Tel: 051-236 3298.
Liverpool. Laskys, St Johns Precinct. Tel: 051-708 5871.
St Helens. Microman Computers, Rainford Industrial Estate, Mill Lane, Rainford. Tel: 0744 885242.
Southport. Central Studios, 38 Eastbank Street. Tel: 0704 31881.

MIDDLESEX

Enfield. Laskys, 44-48 Palace Garden Shopping Centre. Tel: 01-363 6627.
Harrow. Camera Arts, 42 St Anns Road. Tel: 01-427 5469.
Hounslow. Boots, 193-199 High Street. Tel: 01-570 0156.
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Twickenham. Twickenham Computer Centre, 72 Heath Road. Tel: 01-892 7896.
Uxbridge. JKL Computers, 7 Windsor Street. Tel: 0895 51815.

NORFOLK

Norwich. Bonds, All Saints Green. Tel: 0603 24617.

NOTTINGHAMSHIRE

Sutton in Ashfield. H N & L Fisher, 87 Outram Street. Tel: 0623 54734.
Nottingham. Jessops, Victoria Centre. Tel: 0602 418282.
Nottingham. Laskys, 1-4 Smithy Row. Tel: 0602 413049.

OXFORDSHIRE

Abingdon. Ivor Fields Computers, 21 Stert Street. Tel: 0235 21207.
Banbury. Computer Plus, 2 Church Lane. Tel: 0295 55890.
Oxford. Science Studio, 7 Little Clarenden Street. Tel: 0865 54022.

SCOTLAND

Edinburgh. Boots, 101-103 Princes Street. Tel: 031-225 8331.
Edinburgh. John Lewis, St James Centre. Tel: 031-556 9121.
Edinburgh. Laskys, 4 St James Centre. Tel: 031-556 1864.
Glasgow. Boots, 200 Sauchiehall Street. Tel: 041-332 1925.
Glasgow. Boots, Union Street and Argyle Street. Tel: 041-248 7387.

SHROPSHIRE

Telford. Telford Electronics, 38 Mall 4. Tel: 0952 504911.

STAFFORDSHIRE

Newcastle-under-Lyme. Computer Cabin, 24 The Parade, Silverdale. Tel: 0782 636911.
Stafford. Computerama, 59 Foregate Street. Tel: 0785 41899.
Stoke-on-Trent. Computerama 11 Market Square Arcade, Hanley. Tel: 0782 268524.

SUFFOLK

Bury St Edmunds. Boots, 11-13 Cornhill. Tel: 0284 701516.
Ipswich. Brainwave Micros, 24 Crown Street. Tel: 047 350965.

SURREY

Croydon. Laskys 77-81 North End. Tel: 01-681 8443.
Croydon. The Vision Store, 96-98 North End. Tel: 01-681 7539.
South Croydon. Concise Computer Consultants, 1 Carlton Road. Tel: 01-681 6842.
Epsom. The Micro Workshop, 12 Station Approach. Tel: 0372 721533.
Guildford. Walters Computers, Army & Navy, 105-111 High Street. Tel: 0483 68171.
Haslemere. Haslemere Computers, 17 Lower Street. Tel: 0428 54428.
Wallington. Surrey Micro Systems, 53 Woodcote Road. Tel: 01-647 5636.
Woking. Harpers, 71-73 Commercial Way. Tel: 0486 225657.

SUSSEX

Bexhill-on-Sea. Computerware, 22 St Leonards Road. Tel: 0424 223340.
Brighton. Boots, 129 North Street. Tel: 0273 27088.
Brighton. Gamer, 71 East Street. Tel: 0273 728681.
Brighton. Laskys, 151-152 Western Road. Tel: 0273 725625.
Crawley. Gatwick Computers, 62 The Boulevard. Tel: 0293 37842.
Crawley. Laskys, 6-8 Queensway. Tel: 0293 544622.

TYNE & WEAR

Newcastle-upon-Tyne. Bainbridge, Eldon Square. Tel: 0632 325000.
Newcastle-upon-Tyne. Boots, Eldon Square. Tel: 0632 329844.
Newcastle-upon-Tyne. Laskys, 6 Northumberland Street. Tel: 0632 617224.
Newcastle-upon-Tyne. RE Computing, 12 Jesmond Road. Tel: 0632 815580.

WALES

Aberdare. Inkey Computer Services, 70 Mill Street, The Square, Trecynon. Tel: 0685 881828.
Aberystwyth. Aberdata at Galloways, 23 Pier Street. Tel: 0970 615522.
Cardiff. Boots, 26 Queens Street & 105 Frederick Street. Tel: 0222 31291.
Cardiff. P & P Computers, 41 The Hayes. Tel: 0222 26666.
Swansea. Boots, 17 St Marys Arcade, The Quadrant Shopping Centre. Tel: 0792 43461.

WARWICKSHIRE

Coventry. Coventry Micro Centre, 33 Far Gosford Street. Tel: 0203 58942.
Coventry. JBC Micro Services, 200 Earlsdon Avenue, North Earlsdon. Tel: 0203 73813.
Coventry. Laskys, Lower Precinct. Tel: 0203 27712.
Leamington Spa. IC Computers, 43 Russell Street. Tel: 0926 36244.
Leamington Spa. Leamington Hobby Centre, 121 Regent Street. Tel: 0926 29211.
Nuneaton. Micro City, 1a Queens Road. Tel: 0203 382049.
Rugby. OEM Computer Systems, 9-11 Regent Street. Tel: 0788 70522.

WEST MIDLANDS

Birmingham. Boots, City Centre House, 16-17 New Street. Tel: 021-643 7582.
Birmingham. Laskys, 19-21 Corporation Street. Tel: 021-632 6303.
Dudley. Central Computers, 35 Churchill Precinct. Tel: 0384 238169.
Stourbridge. Walters Computer Systems, 12 Hagley Road. Tel: 0384 370811.
Walsall. New Horizon, 1 Goodall Street. Tel: 0922 24821.
West Bromwich. D S Peakman, 7 Queens Square. Tel: 021-525 7910.
Wolverhampton. Laskys, 2 Wulfrum Square. Tel: 0902 714568.

YORKSHIRE

Bradford. Boots, 11 Darley Street. Tel: 0274 390891.
Leeds. Boots, 19 Albion Arcade, Bond Street Centre. Tel: 0532 33551.
Sheffield. Cole Brothers, Barkers Pool. Tel: 0742 78511.
Sheffield. Laskys, 58 Leopold Street. Tel: 0742 750971.
York. York Computer Centre, 7 Stonegate Arcade. Tel: 0904 641862.



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"Obviously, when we look for software here we try to discourage violence but if we apply that kind of rule rigidly we would be turning down half the games. I think perhaps that zap-it-up games are becoming a little bit old hat. But then for every group of people for whom it is old hat there's another group coming up."

Maguire sees big growth ahead in the tertiary sector of education — that is, the universities and polytechnics as well as abroad. She would like to concentrate on titles which showed the machines to be something special, as rule and drill programs are scarcely likely to distinguish Sinclair machines from any other. A computer which may be an intelligent work station for university students would sell in large quantities at corporate level. Sinclair is hoping that the QL will fulfil that need. The BBC micro has been the mainstay of this market, and the QL will have to work hard to beat it.

What plans are there for QL software in the next six months? "Our first titles were announced in QLub news in October. A lot of it is development software, things like compilers which have a roll-on effect. We also have some business software coming out before the end of this year. We've got the Psion chess program too, but I must say games are not the major emphasis for the QL, although the chess program is import-ant as it shows what the QL can do visually. We'll be launching titles every month now for the QL."

A number of people are, however, working on games for the QL and Sinclair has bought an option on the Imagine megagame **Bandersnatch.** Psion, too, has games under development.

Talk of that kind could lead easily to the idea that Sinclair had now forsaken the Spectrum in favour of the QL, and many Sinclair users must feel this way. Does this mean that the Sinclair involvement with Spectrum software in the U.K. will be limited to carrying the present titles?

"Oh no. Not at all. The Spectrum+ is an indication that we think there's a lot of life in that little horse yet. We published seventeen titles for the Spectrum in the autumn. They are all 'educationals', fifteen from Macmillan and two from Psion and ASK. There's a tremendous mileage in the Specrum and we'll certainly be looking for more software for it, although when there's the choice between making some money out of a new game for the Spectrum, which is not going to sell any more Spectrums, and making a piece of software available for the QL which is going to sell the QL to a whole new market, my emphasis has to be on the latter."

It is clear that Sinclair is now poised for overseas expansion, and the groundwork for a large multinational company is being laid. No doubt when the QL production lines have satisfied the demand in the U.K., that too will follow in the steps of the Spectrum. Just as a Coke can be found in extraordinary places, intrepid travellers may find a Spectrum where they least expect it.



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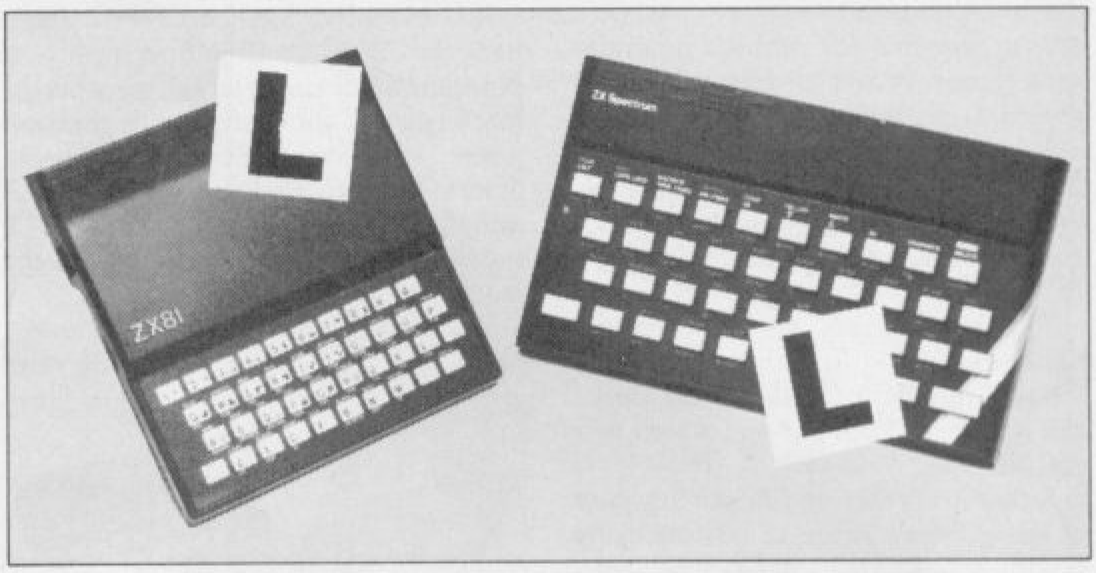
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GLOSSARY

Basic — Beginners' All-purpose Symbolic Instruction Code. A programming language resembling English which is used by beginners because most popular microcomputers have it as standard.
Bug — an error in a program.
EPROM — Erasable Programmable Read-Only Memory. Semi-permanent storage. Information is not erased if the power is turned off in the computer. Programs can be erased by subjecting the memory chips to ultra-violet light. The memory can then be re-programmed using an electrical device called an EPROM blower.
Interface — RS232 and Centronics. A device which enables other computers or add-ons, such as printers, to be connected to the computer. It converts non-standard signals from add-ons to the standard signals of the computer in use.
Kilobyte — (K). A measurement of memory size. Most machines use 16K as a minimum but 48K is generally agreed to be necessary for serious work.
Machine code — an electronic pulse code used by the computer to perform functions and communicate with memory and other devices.
Mnemonics — abbreviated instructions — for example LD for Load — used in machine language programming.
Motherboard — an external printed circuit board which is used like a multi-way plug planner. It enables other printed circuit boards, such as graphics boards and colour boards, to be slotted-in.
Port — a link to the outside world which can be used by programs and the computer.
PCB — printed circuit board. A board which has on it the electronic circuits of the computer.
RAM — Random Access Memory. Information and programs can be stored in this type of memory as electronic pulses which conform to a set of numbers — machine language — in which programs are represented in the computer. When the power is turned off the information will be lost.
ROM — Read Only Memory. Information stored in this type of memory is not lost when the power is switched off.
Software — programs which control the operation of the computer.
Syntax error — a bug caused by incorrect use of a programming language.



Our easy-to-follow guide for new owners

The basic route to a habit-forming hobby

BUYING a Sinclair machine can be the start of a life-time's obsession with home computing. It is easy, however, to become discouraged if everything does not go according to plan from the beginning.

For those with only a little knowledge of computers and their capabilities, the best way to approach the machines is to abandon any ideas for special uses. While the QL computer is big enough for use in small businesses, the Sinclair computers are not really suitable for major uses. It is better to become accustomed to the many facilities and then decide how you wish to use them.

Begin by unpacking your machine, overcoming your surprise at its size and weight and, following the manual, set up the system. If you cannot get the K on the screen, check that everything is plugged into its correct socket and re-set the machine by pulling-out the power plug for one second and try tuning-in again. If still nothing appears, check the power supply unit by shaking it. If it rattles, return it. If it is satisfactory, check your system with that of a friend.

If you have a Spectrum you will have received an introductory booklet which explains what the computer can do and giving detailed instructions on how to set it up. Also included is a fault-finding guide.

Once the K appears you are ready to begin learning about your machine. It can prevent family arguments if you can afford a separate television set for your system. It also makes life easier if you find somewhere to leave your equipment set up permanently. You will find that a few power sockets are needed and a four-way block connector on a short length of extension cable will help to tidy trailing leads.

When using a Spectrum, a television set has to be more finely-tuned than when using a ZX-81 because of the added dimension of colour. If the set is not tuned properly, the colours will look hazy instead of sharp and clear. If no colour can be seen when it is switched on, the power supply or the television set may be at fault.

Some users have experienced some difficulty with some television sets, which include Hitachi, Grundig and Toshiba. Sets which many people have found compatible include the Sony Trinitron, Fidelity and Ferguson. Recent changes in the ULA should make more sets compatible.

The manuals are written in great detail and are reasonably easy to follow. Some of the chapters may not seem immediately relevant but it is worthwhile reading them as you might miss something important.

Patience is needed at that stage to learn the ways in which the computer will accept information. It is tempting to try to enter programs before you are ready but that is likely to lead to errors. For example, words like AND, THEN and AT should not be typed-in letter by letter.

By the time you have reached chapter 11 in the ZX-81 manual and chapter 19 in the Spectrum manual you should have accumulated sufficient knowledge to be

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able to type-in other people's programs, such as those in *Sinclair User* and *Sinclair Programs*, without too much difficulty.

It is important when using the ZX-81 that it is not jolted. Some of the connections can easily work loose and everything which has been entered will be lost.

The manuals are not to everyone's liking and if you find them difficult to follow a number of books on the market can help you. Find the one which suits you best.

As a way of relaxing you can buy some of the growing range of commercially-produced software. That can be loaded directly from cassette but make sure that your machine is big enough to take the tapes you buy.

For the ZX-81 there are a few tapes for the unexpanded 1K machine but the majority require the 16K RAM pack. Similarly on the Spectrum most companies are taking advantage of the possibilities provided by the larger 48K machine rather than providing cassettes for the 16K.

The tapes can vary in quality and it is advisable to read the reviews in *Sinclair User* and use your judgment to find the best.

An alternative method to learn about both the ZX-81 and the Spectrum is to plunge in at the deep end and see what the machines will do. Refer to the manuals when you have difficulties. You can ignore the functions and calculations initially and experiment with PRINT statements to obtain the feel of the machines.

You may already have heard about the problem involved in SAVEing and



LOADing your own cassettes. The manual gives detailed instructions but many of the early ZX-81s would not accept tapes from some recorders. That problem is said to have been overcome but there can still be difficulties.

Usually they occur when LOADing tapes recorded by other people. One simple method to overcome this is to wind the tape to the middle of the program and type LOAD "" followed by NEWLINE; then increase the volume of the recorder slowly with the tape running until the television screen shows four or five thick black bands. If you then re-wind the tape, the program should LOAD normally.

LOADing and SAVEing on the Spectrum is much easier and faster than the ZX-81. One difference is that when SAVEing on the Spectrum the LOAD lead must be disconnected either at the recorder or the Spectrum.

Finally, a health warning. Apart from any practical uses, computing with your Sinclair machine can be a very entertaining hobby and is almost certainly habit-forming. You may easily find yourself crouched over your machine, red-eyed, in the early hours of the morning thinking that in another five minutes you will solve the problem. Try to break that habit by getting into the fresh air and meeting other Sinclair users.

By obtaining a Sinclair computer you find that you have joined a not very exclusive club with many thousands of members, many of whom would be only too happy to advise you if you have difficulties.

Make sure of your regular copies of *Sinclair User* and *Sinclair Programs* and you can be guaranteed many happy hours.



AVOID THE SENTIENT slime trail for as long as you can in **Slime** by Henry Braun of London. Eventually you will come to a sticky end but skill and cunning may keep you alive longer than you would think. The program runs on any Spectrum, and uses the cursor keys for movement.

Slime uses our special abbreviations for graphics characters, so please read the instructions on the first page of Program Printout before typing in the program.

Lines 5–10	Set up the initial values for the variables used. Most are 0 because nothing has happened yet, but x1 and y1 are given the co-ordinates for the starting point on the screen.
Line 30	The beginning of a loop containing the game. Where x1 and y1 were the co-ordinates for the slime trail, x2 and y2 will be your position. x and y are to hold the new position, but first it checks to see that move you make.
Lines 40–50	It would be easy to read the keyboard with a line like IF INKEY$= . . . THEN . . . but that is a slow and inelegant way of doing it. If there are several options you need a line for each one. Instead Henry uses logic operations. The expression (INKEY$="6") is given the value 1 if true

```
   5 LET hi=0
  10 PAPER 7: INK 0: BORDER 2: C
LS : LET s=0: LET x=1: LET y=0:
LET x1=20: LET y1=30
  30 LET x2=x: LET y2=y
  40 LET x=x+(INKEY$="6")-(INKEY
$="7")+(x<1)-(x>20)
  50 LET y=y+(INKEY$="8")-(INKEY
$="5")+(y<1)-(y>30)
  55 IF SCREEN$ (x,y)="*" THEN
GO TO 1000
  60 PRINT AT x2,y2;"(sp)";AT x,
y;"(cc9,ig6,cc8)"
  65 LET x3=x1: LET y3=y1
  67 IF RND>.5 THEN  GO TO 80
```

	and 0 if false. The statement as a whole in line 40 means: "If you are pressing 6 then add one to x, if you are pressing 7 then take one away from x, and if x is smaller than one add one and if it is bigger than 20 subtract one." Those last two ensure you never go off the edge of the screen.
Line 55	SCREEN$ is a function which looks at the characters held in the screen display. This line checks to see if there is slime where you are about to move.
Line 60	The new position is blank so you can move there, and the program prints a flashing graphics character there. cc9 is an abbreviation for a control code, in this case the one which produces the flashing. It is produced by going into extended mode, then holding down CAPS SHIFT and pressing the appropriate key, in this case 9. Nothing will appear on the screen, but the next character will flash.
Line 65	Duplicates the position for the slime.
Line 67	To introduce an element of luck, the slime moves partly at random.
Lines 70–90	Compare your position in x and y with the position of the slime and alter it accordingly. The random feature ensures the slime does not always make the most efficient move towards you.
Line 100	Having survived one move, your score is increased.
Line 110	Sends you back for another move. The fact there is no line 20 is irrelevant, the next instruction will be line 30.
Line 120	Is a rather peculiar safety measure. If the program skipped past line 110 it is sent back there.
Line 1000	The game is over, and your score is displayed.
Lines 1010–1020	If you have the high-score you are told so and a new high score is displayed.
Lines 1030–1070	Ask if you want to play again. In those lines the keyboard is read with IF statements instead of the earlier logic operations, as there would be little gain to the more compressed method.

```
  70 LET x1=x1+(x>x1)-(x<x1)+(x1
<1)-(x1>20)
  75 IF x1<>x3 THEN  GO TO 90
  80 LET y1=y1+(y>y1)-(y<y1)+(y1
<1)-(y1>30)
  90 PRINT AT x1,y1;"(cc4,i*,cc0
)"
 100 LET s=s+1
 110 GO TO 20
 120 GO TO 110
1000 PAUSE 50: CLS : PRINT AT 0,
0;"You stayed alive for ";s;" mo
ves."
1010 IF s>hi THEN  LET hi=s: PRI
NT : PRINT "You got the highscor
e": INPUT "What is your name? ";
a$
1020 IF hi>0 THEN  PRINT "The hi
-score is ";hi;" and was(6*sp)ac
hieved by ";a$
1030 PRINT : PRINT : PRINT : PRI
NT "Another game?(y/n)"
1040 IF INKEY$="" THEN  GO TO 10
40
1050 IF INKEY$="y" THEN  GO TO 1
0
1060 IF INKEY$="n" THEN  STOP
1070 GO TO 1040
```

Happy Days



THE QUAINTLY-NAMED **Happydays** is a calendar program which will tell you the day of the week for any given date, as long as it falls after the introduction of the Julian calendar. That will almost certainly include all of our readers' birthdays, so the program is a good opportunity to discover if you are merry and gay, or work hard for a living, according to the old rhyme.

Enter the day and month as figures, and the year in full, e.g. 1985. Happydays was written by Hsieh Min Hon of Singapore and runs on the ZX-81 in 1K.

```
  10 PRINT "DAY?"
  20 INPUT D
  30 PRINT "MONTH?"
  40 INPUT M
  50 PRINT "YEAR?"
  60 INPUT Y
  70 LET K=INT (.6+(1/M))
  80 LET L=Y-K
  90 LET Q=M+12*K
 100 LET P=L/100
 110 LET A=INT (P/4)
 120 LET B=INT (P)
 130 LET C=INT ((5*L)/4)
 140 LET E=INT (13*(Q+1)/5)
 150 LET Z=E+C-B+A+D-1
 160 LET Z=(Z-(7*INT (Z/7)))+1
 170 PRINT D;"/";M;"/";Y;" IS A
";
 180 IF Z=1 THEN PRINT "SUNDAY"
 190 IF Z=2 THEN PRINT "MONDAY"
 200 IF Z=3 THEN PRINT "TUESDAY"
 210 IF Z=4 THEN PRINT "WEDNESDA
Y"
 220 IF Z=4 THEN PRINT "THURSDAY
"
 230 IF Z=5 THEN PRINT "FRIDAY"
 240 IF Z=6 THEN PRINT "SATURDAY
"
 250 STOP
```

EASY DRAW



IT IS POSSIBLE to produce quite complex line drawings on the Spectrum but many beginners are put off by the somewhat long-winded commands and the need to use co-ordinates.

Easy Draw by Frank Oliver of Knottingley in West Yorkshire takes much of the sweat away by allowing you to simply use the cursor keys. You can also draw diagonal lines automatically and use all the colours. Block graphics can be included in the picture.

The program runs on any Spectrum, and instructions are included.

The program uses our special abbreviations for graphics characters so please read the instructions on the first page of Program Printout.

```
  20 PAPER 7: CLS
  30 PRINT AT 0,11;"EASY DRAW";A
T 2,2;"BY F.OLIVER";AT 4,10;"INS
TRUCTIONS"
  40 REM INSTRUCTIONS
  50 PRINT AT 6,0;"DRAW KEYS = 1
 TO 8 (1-4 diagonal5-8 as cursor
s)"
  60 PRINT AT 8,0;"COLOUR KEYS=Q
WERTYUI (same orderas keyboard)"
  70 PRINT AT 10,0;"KEY 9 = BRIG
HT"
  80 PRINT AT 11,0;"KEY 0 = FILL
 IN CURSER RUN (withdesired colo
ur when finished)"
  90 PRINT AT 13,0;"KEY P=PRINT
: KEY O=STOP PRINT"
 100 PRINT AT 14,0;"KEY A = BLOC
K GRAPHICS (flashingcursor posit
ioned)"
 110 PRINT AT 16,0;"KEY S = HIGH
 RESOLUTION GRAPHICS(x,y plotted
)"
 120 PRINT AT 18,0;"SPACE KEY =
RESTART"
 130 PRINT AT 19,0;"KEY D=DOUBLE
 DRAW SPEED(disablescolours+spac
e,9,0,O-P=NORMAL)"
 140 PRINT  FLASH 1;AT 21,12;"AN
Y KEY"
 150 PAUSE 5000
 160 PAPER 7: CLS
 170 REM SCREEN SET
 180 PRINT AT 3,6;"SELECT BORDER
 COLOUR"
 190 LET a=0: LET c=8: LET d=0:
GO TO 800
 200 PAPER c: CLS : BORDER c: PA
PER 7: CLS
 210 PRINT AT 3,6;"SELECT SCREEN
 COLOUR"
 220 LET c=8: LET a=1: GO TO 800
 230 PAPER c: CLS
 240 REM PROGRAM VARIABLES
 250 LET b=1: LET c=7: LET e=0:
LET f=2: LET h=0: LET x=10: LET
y=15
 260 REM CURSOR RUN
 270 FOR g=1 TO 32: PRINT  PAPER
 c;AT 0,h;"(sp)";AT 21,h;"(sp)":
 LET h=h+1: NEXT g: LET h=1: FOR
 g=1 TO 20: PRINT  PAPER c;AT h,
0;"(sp)";AT h,31;"(sp)": LET h=h
+1: NEXT g: IF d=0 THEN  LET h=0
 280 LET c=0: LET d=1
 290 REM X,Y TRACKIING
 300 LET xx=175-(8.3333333*x)
 310 LET yy=8.2258065*y
 320 REM DRAW VARIABLES,CURSERS,
X,Y PLOT
 330 IF x$="d" THEN  LET f=3
 340 IF f=3 THEN  GO TO 400
 350 IF x$="9" THEN  LET f=1
 360 IF x$="o" THEN  LET f=0
 370 IF x$="0" AND h=0 THEN  GO
TO 270
 380 GO SUB 810
 390 IF h=0 THEN  PRINT  PAPER 0
; INK 7;AT x,0;">";AT x,31;"<";A
T 0,y;"v"
 400 IF h=0 THEN  PRINT  INK 0;
PAPER 7;AT 21,4;"x=";INT xx;"(sp
)";AT 21,23;"y=";INT yy;"(sp)"
 410 LET x$=INKEY$
 420 IF x$="p" THEN  LET f=2
 430 IF e=1 THEN  GO TO 620
 440 REM HIGH RESOLUTION GRAPHIC
S
 450 IF x$="a" THEN  LET e=1
 460 IF x$="1" THEN  LET xx=xx+1
: LET yy=yy+1
 470 IF x$="2" THEN  LET xx=xx-1
: LET yy=yy+1
 480 IF x$="3" THEN  LET xx=xx-1
: LET yy=yy-1
 490 IF x$="4" THEN  LET xx=xx+1
: LET yy=yy-1
 500 IF x$="5" THEN  LET yy=yy-1
 510 IF x$="6" THEN  LET xx=xx-1
 520 IF x$="7" THEN  LET xx=xx+1
 530 IF x$="8" THEN  LET yy=yy+1
 540 IF xx>167 THEN  LET xx=167
 550 IF xx<8 THEN  LET xx=8
 560 IF yy<8 THEN  LET yy=8
 570 IF yy>247 THEN  LET yy=247
 580 IF f=1 THEN  PLOT  BRIGHT 1
; INK c;yy,xx
 590 IF f>1 THEN  PLOT  INK c;yy
,xx
 600 GO TO 330
 610 REM BLOCK GRAPHICS
 620 IF x$="s" THEN  LET e=0
 630 IF h=0 THEN  PRINT  PAPER 7
;AT x,0;"(sp)";AT x,31;"(sp)";AT
0,y;"(sp)"
 640 IF x$="1" THEN  LET x=x-1:
LET y=y+1
 650 IF x$="2" THEN  LET x=x+1:
LET y=y+1
 660 IF x$="3" THEN  LET x=x+1:
LET y=y-1
 670 IF x$="4" THEN  LET x=x-1:
LET y=y-1
 680 IF x$="5" THEN  LET y=y-1
 690 IF x$="6" THEN  LET x=x+1
 700 IF x$="7" THEN  LET x=x-1
 710 IF x$="8" THEN  LET y=y+1
 720 IF x<1 THEN  LET x=1
 730 IF x>20 THEN  LET x=20
 740 IF y<1 THEN  LET y=1
 750 IF y>30 THEN  LET y=30
 760 IF f=1 THEN  PRINT  BRIGHT
1; PAPER c;AT x,y;"(sp)"
 770 IF f>1 THEN  PRINT  PAPER c
;AT x,y;"(sp)"
 780 GO TO 300
 790 REM COLOUR LOOP
 800 PRINT AT 10,12;"Q=BLUE";AT
11,12;"W=RED";AT 12,12;"E=MAGENT
A";AT 13,12;"R=GREEN";AT 14,12;"
T=CYAN";AT 15,12;"Y=YELLOW";AT 1
6,12;"U=WHITE";AT 17,12;"I=BLACK
"
 805 FOR k=1 TO 100: NEXT k
 810 LET x$=INKEY$
 820 IF x$="q" THEN  BEEP .5,0:
LET c=1
 830 IF x$="w" THEN  BEEP .5,2.0
39: LET c=2
 840 IF x$="e" THEN  BEEP .5,3.8
6: LET c=3
 850 IF x$="r" THEN  BEEP .5,4.9
8: LET c=4
 860 IF x$="t" THEN  BEEP .5,7.0
2: LET c=5
 870 IF x$="y" THEN  BEEP .5,8.8
4: LET c=6
 880 IF x$="u" THEN  BEEP .5,10.
88: LET c=7
 890 IF x$="i" THEN  BEEP .5,12:
 LET c=0
 900 IF x$="(sp)" THEN  GO TO 20
 910 IF d=1 THEN  RETURN
 920 IF c=8 THEN  GO TO 810
 930 IF a=1 THEN  GO TO 230
 940 IF c<8 THEN  GO TO 200
```

Now you can use your 48k Spectrum to write a letter or a report, to compile a mailing list or classify your record collection, to check your bank statement or sort out your family finances (and then translate them into clearly-defined graphics) . . . all for just £5.95.

Quick to learn, easy to use, that's . . .

MINI OFFICE marks a long-awaited breakthrough in dramatically reducing the cost of personal computing.

For the first time it makes available to everyone an easy-to-operate version of four of the most popular business computing applications – and at a price anyone can afford.

Never before has a word processor been sold for anything as low as £5.95. Nor a database manager. Nor a spreadsheet. Nor a graphics program.

Yet Mini Office contains them all.

So how was it done?

It all started with a proposal that a package should be written that would give home users a gentle introduction to the kind of software that businesses were running on their computers.

At that stage there was no intention that it should be an ambitious package. Just a simple program that could be sold at a very low price.

First, experts in business software programming were called in and were told what was required. Their enthusiasm was immediate.

But what happened next was totally unexpected. For they all came up with ideas that would considerably expand their original brief.

In the end what had been planned as little more than a beginners' guide to word processing, database management, spreadsheets and graphics had been turned into a full scale suite of programs covering all four applications.

In fact the only part of the brief that remained was the original insistence that the package should be quick to learn and easy to use.

And despite all the extra sophistication that had been written into it, it was decided that the price should still be kept at the very low figure originally fixed.

So how does Mini Office operate?

Using the **Word Processor** is simplicity itself. There are none of the cryptic coded instructions that had to be mastered by people learning the early word processors.

You start by selecting the size of type you prefer – either normal or double-size. The latter is a feature that you cannot find on any other word processor.

It is particularly suitable for the partially sighted – in many cases giving them their very first opportunity to use a word processor.

This means they can use a Spectrum to compose a letter, using the double-size mode, and then print it out using normal size type.

For many people this could be the first time they can send out a perfectly typed letter without outside help.

Primary school teachers are already making great use of the double-size function, both on the screen and on hard copy printouts.

A unique feature is
the double size text
option in both
printer and edit
mode – perfect for
young children and
people with poor
vision.

The word processor – with double size characters

While you are using the word processor three useful pieces of information are displayed across the top of the screen.

They tell you how much time has elapsed since you started using it, the number of words you have written so far, and how many characters you can key in before the Spectrum's memory is full.

At any time you can press a key which tells you your typing speed. This is a most useful function, and can play an important part in increasing your efficiency at the keyboard.

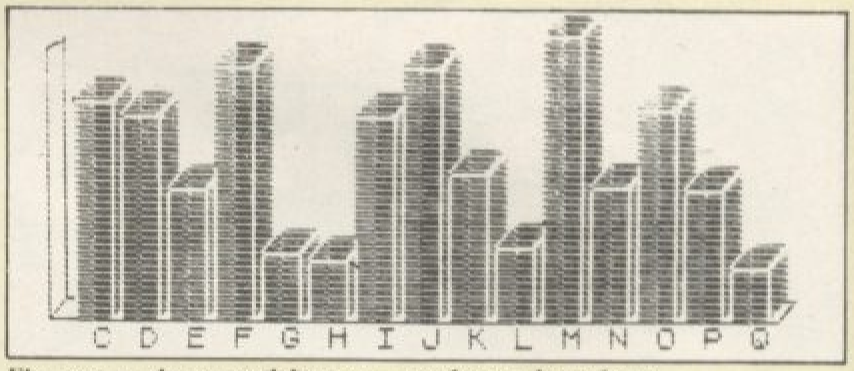
You can also decide the size of the margin, the line length and the tab positions. Text can be copied from one part of the document to another.

At any time you can preview the text to see how it would look when printed out.

As with all the other programs in Mini Office, your work can be saved to tape and loaded when you want to use it again. It can also be printed out.

The **Database** program can be used to store a mass of information. It can be retrieved, in its entirety or just the parts you require for a particular purpose, whenever you need it.

The operation is so simple that a useful database can be created in minutes rather than days – and you certainly don't need any computer experience to set it up.



Figures on the spreadsheet can produce a bar chart . . .

The search facility is very easy to use. You can search for a particular word or part of a word. Or you can order a numeric search – such as telling the computer to find all the numbers greater or less than the one you provide.

You can carry out multiple sorts. For instance, if you have built up a mailing list containing a list of names, addresses, telephone numbers, occupations and ages you can ask the database to provide you with a list of records in order of occupations and ages.

One powerful option allows you to replace anything on the database without having to go through the whole lot making amendments yourself.

You could, for instance, instruct it to find each reference to "teacher" and replace it with "lecturer".

The **Spreadsheet** is a new version of the program that marked an important milestone



in business computing – Visicalc.

It is often pointed out that this one program alone has helped to sell more personal computers than any other.

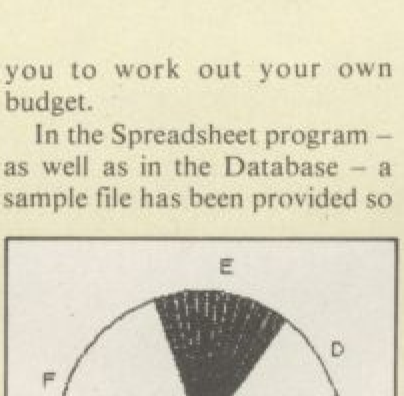
Certainly Visicalc and its derivitives have never been shaken from their position at the top of the list of best-selling business programs.

Yet the concept is very simple – a giant worksheet of rows and columns, only part of which can be seen on your screen at any one time. Into any position on the sheet you can put numbers, labels and mathematical formula.

And when you alter any figure its effect ripples through the rest of the sheet, changing any totals as may be necessary.

The Mini Office version is ideal for home finance, providing you with an effortless means of keeping tabs on your income and expenditure – and enabling you to work out your own budget.

In the Spreadsheet program – as well as in the Database – a sample file has been provided so



. . . or a pie chart

that you can experiment with it before entering your own data.

One feature that has been included that does not exist in any other spreadsheet is a warning device to prevent you accidentally erasing formulae – a very useful precaution.

The **Graphics** program uses the standard business graphics – line, bar and pie charts. This is something not always available on far more expensive spreadsheet packages.

The program uses data you have already prepared on the spreadsheet. You have to identify which set of information you require to see in graph form – such as by indicating which row or column – and then which of the graphs you require.

The graph is then automatically configured exactly as you require it. If you have a printer capable of producing graphics you can also print out hard copies for a permanent record.

Because the original intention was to produce a package for people new to all these applications it is accompanied by a fully-detailed, easy to understand manual.

This 32 page free booklet gives clear instructions about how to use all four programs and in itself forms a concise introduction for first-time users.

If you want to start doing more with your Spectrum than just playing games, this package is your ideal introduction to the four most popular applications for professional computers.

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Please send me ________ copy/copies of
Mini Office for Spectrum 48k
☐ I enclose cheque made payable to
Database Publications Ltd.
for £ ________

I wish to pay by
☐ Access ☐ Visa No.________ Expiry date________

Signed________

Name________

Address________

____

Post to: Mini Office Offer, Database Publications,
68 Chester Road, Hazel Grove, Stockport SK7 5NY.

SU1

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Now, with the new Stonechip Spectrum Keyboard, the user has no worry of damaging the Spectrum itself as improved designing enables it to fit the case perfectly.

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Your Sinclair guarantee need not be invalidated since the Spectrum does not require removal from its case.



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Headers examined

Andrew Hewson examines headerless files and block line deletion



IT SOMETIMES happens that an item in this column rings a bell with many readers and triggers a flood of letters on the subject. My piece in *Sinclair User* November 1984 had that effect because it included a short section on SAVEing and LOADing headerless files on the Spectrum which interested a number of correspondents. I shall expand on the theme this month.

First, though, I must correct an error that crept in and was brought to my attention by Martin Carre of Guernsey, amongst others. It occurred in a table included in the piece which listed two machine code routines for SAVEing and LOADing the screen in a headerless file. The routines had been written as if the Spectrum display file and attributes file were together 6192 bytes long whereas they are in fact 6912 bytes. As a result the routines omitted to SAVE or LOAD the latter part of the attributes file. Apologies to all those who were lead astray. The correct version of the routines is given in Table 1.

Decimal	Assembler	Comment
167	AND A	Clear carry
62 255	LD A,255	Load A with 255
221 33 0 64	LD IX,16384	SAVE from 16384
17 0 27	LD DE,6912	Length 6912
205 194 4	CALL 1218	Call SAVE routine
201	RET	Return
55	SCF	Set carry
62 255	LD A,255	Load A with 255
221 33 0 64	LD IX,16384	LOAD at 16384
17 0 27	LD DE,6912	Length 6912
205 86 5	CALL 1366	Call LOAD routine
201	RET	Return

Table 1. Two Spectrum routines to SAVE and LOAD the screen display to and from a headerless file.

Repeating the routines gives the opportunity to answer Warren Milburn of Ryton who asks: **"Please could you tell me how to alter the start address and bytes length in your routines for saving and loading headerless files?"**

The start address is passed to the routines in the ix register pair and the length is passed in the de register pair and so to adapt the routines to your own purposes you must alter the values passed. Assuming you know the start address and number of bytes that you wish to SAVE or LOAD and that the routines are stored consecutively in the printer buffer, then the procedure for LOADing is as follows:

POKE 23301, START−256*INT (START/256)
POKE 23302, INT (START/256)
POKE 23304, LENGTH−256*INT (LENGTH/256)
POKE 23305, INT (LENGTH/256)

To modify the SAVE routine POKE the same values into 23311, 23312, 23314 and 23315 respectively.

The routine will be of use to Mike Hughes of Epsom who writes: **"I have written a cataloguing program which requires me to SAVE three character arrays but it is a nuisance waiting for each one to SAVE in turn and then pressing a key before the next SAVE. Is there any way of by-passing the 'start tape then press any key' message?"**

The best way of tackling the problem would seem at first sight to be to SAVE the contents of the variables area as a CODE file. It is quite easy to calculate the starting address and length parameters required for the SAVE "" CODE command — the starting address would be the value held in the VARS system variable and the length would be the difference between VARS and the E_LINE system variable.

Decimal	Assembler	Comment
42 89 92	ld hl, (23641)	E_LINE to hl
43	dec hl	Backspace to byte containing 128
237 91 75 92	ld de, (23627)	VARS to de
167	and a	Clear carry flag
237 82	sbc hl,de	Calculate length of variables area
235	ex de,hl	Transfer length to de
66	ld b,d	Copy length to bc
75	ld c,e	
197	push bc	Save bc on the stack
221 42 75 92	ld ix,(23627)	VARS (ie address to SAVE from) to ix
62 255	ld a,255	Signal cassette main file
205 194 4	call 1218	Call ROM SAVE routine
193	pop bc	Retrieve length from stack
237 67 0 91	ld (23296), bc	Store length at beginning of buffer
201	ret	Return

Table 2. A Spectrum routine to SAVE the variables area as a headerless file.

The method would work well for SAVEing all variables but problems would occur on reLOADing because the starting address, length or arrangement of the variables area might have changed in between the two events. The starting address would have changed, for example, if a microdrive had been brought into use so that the microdrive maps occupied more space lower down in memory thereby causing the Basic program, variables and other items to be shuffled further up in RAM.

The length of the variables area would change if a new variable were brought into use or if a pre-existing array were reDIMensioned. The arrangement of the variables area would have changed if new data were written into a pre-existing string because the Spectrum handles this task by creating the string afresh at the top of the varia-

continued on page 190

continued from page 189

bles area before deleting the old version, which is generally lower down in memory.

Thus the reLOADed CODE file would often end up incorrectly placed in the Spectrum memory or in the correct place overwriting the wrong things.

The safest solution, which although not ideal ensures that the data that is reLOADed does not corrupt the program, is to SAVE the variables area using a short machine code routine as a headerless file. On reLOADing use another machine code routine to execute the following steps: 1 — delete all the current Basic variables using the ROM routine for recovering redundant memory; 2 — create a new variables area large enough to hold the incoming data using the ROM routine for creating space in memory; 3 — reLOAD the variables using the routine for LOADing headerless files.

Decimal	Assembler	Comment
42 89 92	ld hl, (23641)	E_LINE to hl
43	dec hl	Backspace to byte containing 128
237 91 75 92	ld de, (23627)	VARS to de
205 229 25	call 6629	Call ROM routine to delete all variables
42 75 92	ld hl, (23627)	VARS to hl
237 75 0 91	ld bc, (23296)	New size for variables area to bc
205 85 22	call 5717	Call ROM routine to create space
55	scf	Set carry flag
62 255	ld a,255	Signal cassette main file
221 42 75 92	ld ix, (23627)	VARS to ix
237 91 0 91	ld de, (23296)	Length to de
205 86 5	call 1366	Call ROM routine to LOAD variables
201	ret	

Table 3. A Spectrum routine to delete all current variables and replace them with data from cassette.

Two routines to perform the tasks are listed in Tables 2 and 3 and as usual the decimal codes are listed so that readers without an assembler to hand can load the routines into the printer buffer using the decimal loader in Table 4.

The first routine is an adaptation of the SAVE routine in Table 1. Notice that the length of the variables area is saved in the printer buffer at address 23296 so that the load routine can reference the value when it is required. The user can also PRINT the value by invoking the routine using the PRINT USR command — because it is left in the bc register pair at the completion of the routine — so that the value can be noted for future reference.

The second routine makes two ROM calls. The first recovers the space lying between the addresses pointed to by the dep and hl register pairs thereby deleting all current variables. The second routine creates a space of length bc at the address pointed to by hl thereby creating room for the new variables. Those two ROM routines are very useful because they look after all the relevant system variable pointers no matter whereabouts in memory that the space is to be deleted or created.

The delete routine can be used to deal with a problem raised by Jeff Sims of Wigan. He writes: **I sometimes wish to delete large chunks of an existing program in order to create a new version which shares some of the original subroutines. Is there a way of doing so which is more convenient than deleting each line?**

I have described a technique previously in this column for deleting large chunks of a Basic program by manipulating the hidden pointer which the machine places after each line number to tell it the length of the line. It is comparatively straightforward to POKE a new value into the pointer in the first line of the chunk to be deleted so that the machine thinks it is dealing with one monster line. The monster line can then be deleted in the conventional way by entering the line number.

The routine listed in Table 5 achieves the same end in a rather more elegant fashion. The user POKEs the first and last line numbers of the section he wishes to delete into the first four bytes of the printer buffer as follows:

```
10 FOR I=23298 TO 23551
20 INPUT J
30 PRINT I,J
40 POKE I,J
50 NEXT I
```

Table 4. A simple decimal loader for POKEing machine code into the printer buffer starting at address 23298.

POKE 23296, LINE1−256*INT (LINE1/256)
POKE 23297, INT (LINE1/256)
POKE 23298, LINE2−256*INT (LINE2/256)
POKE 23299, INT (LINE2/256)

The routine checks each number in turn to ensure that it is non-zero and then calls the ROM routine at 6510 which returns, in the hl register, the address of the first of the two lines in RAM. It calls the same routine a second time to obtain the address of the byte following the end of the second line. The difference between the two addresses is checked to make sure that it is positive and if so the ROM routine at 6629 is called to recover the space thereby deleting the lines.

Finally I have been taken to task by Alex King of Bristol who writes: **Why do you persist in using decimal in your machine code listings when almost all other sources use hexadecimal?**

It is true that hexadecimal is the most common means of identifying numbers in assembly language programs but I feel that the majority of readers are not familiar with hex. Those who prefer hex are probably adept at conversions whereas the converse is not true — those who dislike hex probably find conversion confusing. Decimal is a compromise.

● *Please address problems and queries to Andrew Hewson, Helpline, Graham Close, Blewbury, Oxfordshire.*

Decimal	Assembler	Comment
42 0 91	ld hl, (23296)	Fetch first line number
124	ld a,h	Return if both h
181	or l	and l registers
200	ret z	are zero
237 91 2 91	ld de, (23298)	Fetch second line number
122	ld a,d	Return if both d
179	or e	and e registers
200	ret z	are zero
213	push de	Save de on the stack
205 110 25	call 6510	Fetch address of first line into hl
227	ex (sp),hl	Store hl and recover de
35	inc hl	Increment number of second line
205 110 25	call 6510	Fetch address of end of second line
209	pop de	Recover first address
167	and a	Clear carry flag
237 82	sbc hl,de	Calculate length to be recovered
200	ret z	Return if zero
216	ret c	Return if negative
25	add hl,de	Rebuild address
205 229 25	call 6629	Recover space
201	ret	Return

Table 5. A Spectrum routine to delete all Basic lines lying between two line numbers passed to the routine in the printer buffer.

Britain

Aylesbury Computer Club: 12 Long Plough, Aston Clinton, Aylesbury, Bucks.
Aylesbury ZX Computer Club: Ken Knight, 22 Mount Street, Aylesbury (5181 or 630867).
Basildon: Roundacre Microcomputer Users' Club. J Hazell, Basildon 285119/416333. Meetings every Wednesday 7.30 to 10.30pm.
Blackburn Computer Club: 1 Sutton Street, Feniscowles, Blackburn, Lancashire. Tel: B'burn 60033 (office hours) or 28127. Meets twice a month, subscription £5 (£3 juniors).
Bristol Yate and Sodbury Computer Club: 99 Woodchester Yate, Bristol, BS17 4TX.
Broughty Ferry Magic Micro Spectrum Users Club: Lindsay Darroch 78 Marlee Road, Broughty Ferry (0382) 75459 or Fraser McGuire, 7 Kenaway Place, Broughty Ferry, Dundee (0382) 75821.
Cardiff ZX Club: Steve Smith (0222) 593237 or Mike Hayes (0222) 371732. Meets twice a month.
Colchester Sinclair User Group: Richard Lown, 102 Prettygate Road, Colchester CO3 4EE.
Computer Club International, 6 Drumdoon Walk, Downpatrick, N. Ireland BT30 6UF.
Cornard Sinclair User Group: Neil MacDonald, 15 Potkiln Road, Great Cornard, Sudbury, Suffolk CO10 0DA.
Crewe and Nantwich Computer Users' Club: J E A Symondson, 46 London Road, Stapeley, Nantwich, Cheshire CW5 7JL.
Daventry & District Computer Club: c/o Daventry Ex-servicemen's Club, Market Square, Daventry, Northants.
Doncaster and District Micro Club: John Woods, 60 Dundas Road, Wheatley, Doncaster DN2 4DR; (0302) 29357.
Eastwood Town Microcomputer Club: E N Ryan, 15 Queens Square, Eastwood, Nottingham NG16 3BJ.
Edinburgh: Edinburgh Home Computing Club. John Palmer (031 661 3183) or Iain Robertson (031 441 2361).
EZUG-Educational ZX-80-81 Users' Group: Eric Deeson, Highgate School, Birmingham B12 9DS.
Furness Computer Club: R J C Wade, 67 Sands Road, Ulverston, Cumbria (Ulverton 55068). Meets every other Wednesday.
Glasgow ZX-80-81 Users' Club: Ian Watt, 107 Greenwood Road, Clarkston, Glasgow G76 7LW (041 638 1241).
Gloucester: Mid-weekly Spectrum User Group. Barry Ledbury, 8 Linnet Close, Gloucester GL4 9XA (0452) 23186.
Gravesend Computer Club: c/o The Extra Tuition Centre, 39 The Terrace, Gravesend, Kent DA12 2BA. Bi-monthly magazine and membership card.
Hassocks ZX Micro User Club, Sussex: Paul King (Hassocks 4530).
Hobbit Appreciation Society, 12 Middlefield Lane, Hinckley, Leicestershire LE10 0RB. Free newsletter with SAE.
Independent QL Users Group: Brian Pain, 24 Oxford Street, Stony Stratford, Milton Keynes MK11 1JU. Tel: 0908 564271. Publishes newsletter.
Inverclyde ZX-81 Users' Club: Robert Watt, 9 St. John's Road, Gourock, Renfrewshire PA19 1PL (Gourock 39967). Meets every other Monday at Greenock Society of the Deaf, Kelly Street, Greenock.
Keighley Computer Club: Colin Price, Redholt, Ingrow, Keighley (603133).
Lambeth Computer Club: Robert Baker, 32 Heatherington Road, London SW4 7NX.
Liverpool ZX Club: Meetings every Wednesday 7pm at Youth Activities Centre. Belmont Road, Liverpool 6. Keith Archer, 031-236 6109 (daytime).
Llanelli Computer Club: 40 Tan-Y-Bryn, Burry Port, Dyfed. Llanelli 56917.
Manchester Sinclair Users' Club: Meets every Wednesday, 7.30pm, at Longsight Library, 519 Stockport Road, Longsight — 061-225 6997 or 061 445 6316.
Meopham: National ZX Spectrum User Club. Guy Fullalove, Woodcotes, Camer Park, Meopham, Kent DA13 0XS. Bi-monthly newsletter, subscription £1.50. Send SAE for details.
Merseyside Co-op ZX Users' Group: Keith Driscoll, 53 Melville Road, Bootle, Merseyside L20 6NE; 051-922 3163.
Micro Users' Group: 316 Kingston Road, Ewell, Surrey KT19 0SY.
Mid-Kent Micro Club: Meets once monthly. Enquiries to M Gates, 65 Buckland Road, Maidstone ME16 0SH.
Mill Lane Association Computer Group: Bryan McAlley, 1 Cowleaze, Chinnor, Oxfordshire. (0844) 52426.
Newcastle (Staffs) Computer Club: Meetings at Newcastle Youth and Adult Centre, Thursday, 7.30. Enquiries to R G Martin (0782 62065).
North Hertfordshire Home Computer Club: R Crutchfield, 2 Durham Road, Stevenage; Meetings: first Friday of the month at the Settlement, Nevells Road, Letchworth.
Northern Ireland Sinclair Users' Club: P Gibson, 11 Fitzjames Park, Newtownards, Co Down BT23 4BU.
North London Hobby Computer Club: ZX users' group meets at North London Polytechnic, Holloway Road, London N7 Monday, 6pm.
Nottingham Microcomputer Club: ZX-80-81 users' group, G E Basford, 9 Holme Close, The Pastures, Woodborough, Nottingham.
Orpington Computer Club: Roger Pyatt, 23 Arundel Drive, Orpington, Kent (Orpington 20281).
Perth and District Amateur Computer Society: Alastair MacPherson, 154 Oakbank Road, Perth PH1 1HA (29633). Meetings: third Tuesday of each month at Hunters Lodge Motel, Bankfoot.
Regis Amateur Microcomputer Society: R H Wallis, 22 Mallard Crescent, Pagham, Bognor Regis, West Sussex PO21 4UU.
Roche Computer Club: 8 Victoria Road, Coop Rooms, Roche, Cornwall: 0726 890473. Twice weekly meetings, Monday and Friday.
Saltcoats Computer Club: Colin Borland, 117 High Road, Saltcoats, Ayrshire KA21 5SD. Weekly meetings.
Sinclair Postal User Group: 24 St. Mary's Way, Code SUL, Chigwell, Essex IG7 5BX. Produces magazine with competitions.
Scunthorpe ZX Club: C P Hazleton, 26 Rilestone Place, Bottesford, Scunthorpe; (0724 63466).
Sheffield: South Yorkshire Personal Computing Group. R Alderton (0742 20571), S Gray (0742 351440), P Sanderson (0742 351895).
Sinclair Amateur Radio User Group: SAE or two IRCs for details. Paul Newman G4 1NP, 3 Red House Lane, Leiston, Suffolk IP16 4JZ.
Sittingbourne: Anurag Vidyarth (0795 73149).
St Albans: Bi-monthly meetings and a magazine. Details from Adam Slater, 40 Watford Road, St Albans, Herts AL1 2HA. (0727 54176).
Stratford-on-Avon Computer Club: Meets on the second Wednesday of every month. Telephone: 0789 68080 for details.
Swansea Computer Club: B J Candy, Jr Gorlau, Killay, Swansea (203811).
Swindon ZX Computer Club: Andrew Bartlett, 47 Grosvenor Road, Swindon, Wilts SN1 4LT; (0793) 3077. Monthly meetings and library.
Sutton: Sutton Library Computer Club, D Wilkins, 22 Chestnut Court, Mulgrave Road, Sutton, Surrey SM2 6LR.
Washington Sinclair Users' Club, Columbia Community Centre, Tyne and Wear. Meets twice a month, tel. 4179483 or 4167367.
West Sussex: Midhurst and District Computer User Group. Enquiries to V Weston (073 081 3876), R Armes (073 081 3279).
Worle Computer Club: S W Rabone, 18 Castle Road, Worle, Weston-super-Mare BS22 9JW (Weston-super-Mare 513068).
Universal ZX Club: Postal club for Spectrum owners in the U.K. and abroad. C. Shaw, 1 Swiss Walk, Batley, W. Yorkshire.
ZX-Aid: Conrad Roe, 25 Cherry Tree Avenue, Walsall WS5 4LH. Please include sae. Meetings twice monthly.

Overseas

Australia: Australian ZX Users' Newsletter, incorporating QL User. Paul Janson, P.O. Box 397, Dapto 3530, Australia. Also seeks unpaid contributions for the newsletter.—W.A. ZX Users' Group, Garth Gregson, 34 Chester Street, South Fremantle 6162. Phone 3351671.
Austria: ZX User Club, Thomas Christian, c/o Wissenschaft Forscht e. V., Postfach 141, A1190 Vienna. Meets every first Friday of the month. Telephone 0222-44 32 050 for details.
Denmark: Danmarks National ZX-8081 Klub (DNZK), Jens Larson, Skovmosevej 6.4200 Slagelese, post giro 1 46 24 66.
ZZ-Brugergruppen i Danmark, Boks 44, 2650 Hvidovre, Gratis medlemskab og gratis blad til enhver interesseret.
J Niels-Erik Hartmann, OZ-ZX-Radioamator, Bruger Gruppe, Bredgade 25 DK-4900, Nakskov.
Finland: ZX-kerho, c/o Kalevi Hamalainen, Siltakatu 9 A 8, 33100 Tampere 10, Finland. Phone 35831-34238. Publishes quarterly paper.
France: Club Micro-Europe, Chemin du Moulin 38, B-1328 OHAIN, Belgium (19/32/2/6332769 ou soir 19/32/2/6537468) or Paris-Micro, 19 rue de Tilly, 92700, Colombes, France; associated with Club Micro-Europe.
08 Informatique Clubs, 18 rue P Curie, 08000 Charleville-Mezieres, 24/572106; associated with Club Micro-Europe.
Yves Chapron, no. SUS-1047, Rue du Puy, La Terrasse, 38660 Le Touvet, France. Specifically for users in the Alps.
Germany: ZX Club, a postal club; contact Aribert Deckers, Postfach 967, D-7000 Stuttgart 1, West Germany.
Greece: Athens Spectrum Club, Paris Stamelos, Spetsou 2, isi22 Marousi, Athens, Greece.
Indonesia: Jakarta ZX-80/81 Users' Club, J S Wijaya, PO Box 20, Jkukg, Jakarta, Utara, Indonesia.
Irish Amateur Computer Club: Martin Stapleton, 48 Seacourt, Clontarf, Dublin 3. (331304).
Irish Sinclair Users Club: PO Box 1238, Dublin 1. Publishes a newsletter. Send SAE for details.

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Club Corner

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Italy: Sinclair Club, Via Molino Vecchio 10/F, 40026 Imola, Italy. Genova Sinclair Club; Vittorio Gioia, Via F Corridoni, 2-1, telephone 010 3125 51.

The Netherlands: Clive's Bits and Bytes, Paus Joannesstraat 32, 6235 CK Ulestraten. Telephone 043-644244.

Republic of Ireland: Irish ZX-8081 Users' Club, 73 Cnoc Crionain, Baile Atha, Cliath 1.

Singapore: Sinclair Users' Group: Charles Wong, 1005 Upper Bukit Timah Road, Singapore 2367.

South Africa: Amateur Spectrum Users' Club, PO Box 280, Winklespruit, Natal 4145. Steve Reinemo is interested in corresponding with users worldwide.
South African Sinclair Users' Club: PO Box 3923, Randburg 2125. Simon Lucas, chairman. Tel. (011) 704 2596.
Dumont and Syndercombe Amateur Computer Club. Jean-Pierre Dumont would like to correspond with ZX-81 owners via tapes. Write to 8 Kipling Road, Farrarmere, Benoni 1500, Transvaal.

ZX SA Club: Jonathan Jones, House 14, Anglo Alpha PO Box 15, 1725 Roodepoorf.

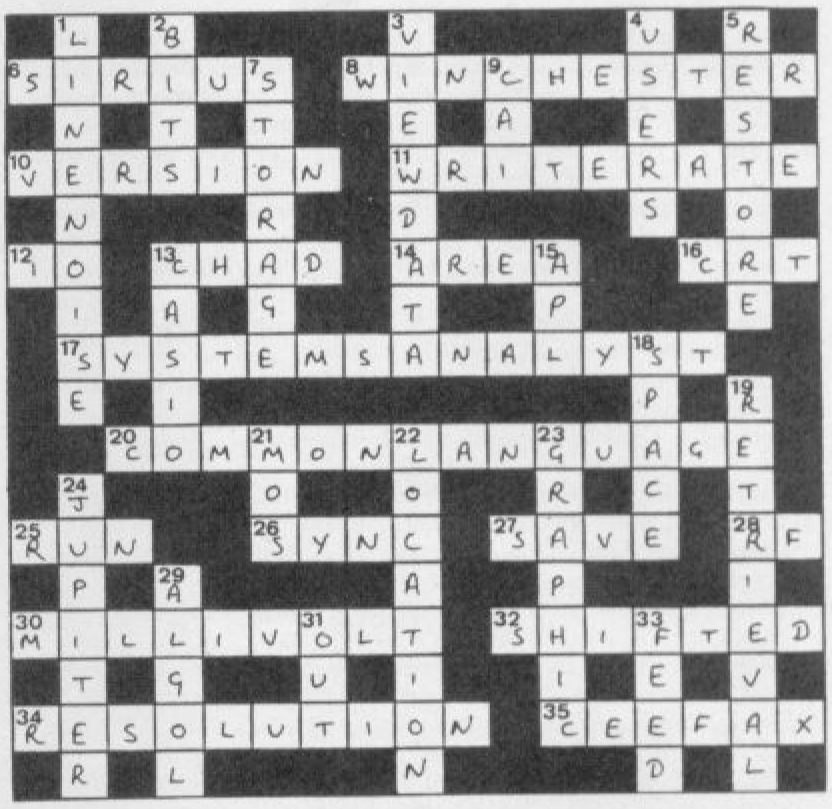
Spain: Club Nacional de Usuarios del ZX-81, Joseph-Oriol Tomas, Avda. de Madrid, No 203 207, 10, 3a esc. A Barcelona-14 Espana. International ZX Spectrum Club: Gabriel Indalecio Cano, Sardana, 4 atrico 2a, San Andres de la Barca, Barcelona. Send international reply coupon. Produces a bi-monthly magazine. Spanish ZX Micro Club: Apartado 181, Alicante (Costa Blanca), Spain.
ZX Club Spain; C Benito PO Box 3253, Madrid, Spain.

Swedish ZX-club: Sinclair Datorklubben, Box 1007, S-122, 22 Enskede.

United States: Bay Area ZX-80 User Group, 2660 Las Aromas, Oakland CA94611.—Harvard Group, Bolton Road, Harvard MA 01451: (617 456 3967).—SAF Users' Group, 2749 Eden Road, Leslie, Michigan 49251.—ZX Users Group of New York, Box 560 Wall Street, New York, N.Y. USA 10005. Subscription $15US, publishes international newsletter. Seeks newsletter exchange with other groups.

ZXWORD

SOLUTION





If we have reviewed a program we have given it a rating known as the Gilbert Factor, named after our Software editor, John Gilbert. That factor includes clarity of instructions, speed of operation, ease of use, originality, lasting appeal, use made of graphics and sound, and success in accomplishing stated aims.

ZX-81

Adventure

Adventure	Bug-Byte	6
Adventure	Gavin Barker	6
Adventure 1	Abersoft	6
Black Crystal	Mastervision	7
Dungeons of Doom	Woosoft	*
Espionage Island	Artic	*
Greedy Gulch	Phipps	7
Inca Curse	Sinclair	*
Knight's Quest	Phipps	*
Lost Island	JRS	*
Magic Mountain	Phipps	*
Merchant of Venus	Crystal	7
Pharoah's Tomb	Phipps	*
Pimania	Automata	6
Secret Valley	New Soft	*
Serpents Tomb	Vortex	*
Ship of Doom	Artic	7
The Great Western	New Soft	*
Time Bandits	New Soft	*
Tomb of Dracula	Felix	*
Trader Trilogy	Quicksilva	6
Volcanic Dungeon	Mastervision	5
World of Illusions	Contrast	4

Arcade

Alien Dropout	Silversoft	*
Asteroids	Silversoft	8
Asteroids	Software Farm	6
Astral Convoy	Vortex	*
Bank Robber	Romik	6
Bears in the Wood	Unicorn	6
Bubble Bugs	Romik	6
Byter	Protek	*
Cassette 1	Orwin	7
Cassette 2-5	Orwin	7
City Patrol	Sinclair	7
Damper	Quicksilva	7
Defenda	Quicksilva	8
Door Slammer	Cathedral	7
Forty-Niner	Software Farm	9
Froggy	DJL	7
Full-screen Breakout	New Generation	*
Galactic Trooper	Romik	6
Galaxians	Quicksilva	6
Galaxy Jailbreak	Romik	6
Games 2	JRS	*
Games Tape 1	J K Greye	*
Games Tape 2	J K Greye	*
Games Tape 3	J K Greye	*
Gamestape 1	Fawkes Computing	7
Glooper	Quicksilva	7
Gloops	Quicksilva	5
Gobbleman	Artic	*
Gobbler	Software Farm	*
Grand Prix	dk'tronics	*
Gulp 2	Campbell	*
Hang Glider	S Electronics	6
Hickstead	CCS	5
High-resolution Invaders	Odyssey	*
Invaders	Abersoft	*
Invaders	Bug-Byte	5
Invaders	Odyssey	8
Invaders	Selec	7
Invaders	Silversoft	*
Krazy Kong	PSS	*
M. Mouse goes de-bugging	Lothlorien	7
Maze Death Race	PSS	*
Maze Man	Abersoft	*
Mazogs	Bug-Byte	8
Micro Mouse	Lothlorien	7
Namtir Raiders	Artic	8
Night Gunner	Digital Integration	5
Puckman	Hewson	*
Rocket Man	Software Farm	7
Sabotage	Sinclair	6
Six Games	A Stubbs	5
Space Raiders	Sinclair	*
Space Rescue	D. Pinch	7
Space Trek	JRS	*
3D Monster Maze	New Generation	9
Three Games Cassette	McGraw Hill	8
Zuckman	DJL	8
ZX Invasion Force	Artic	*
ZX Panic	Selec	4
ZX-81 1K Games Pack	Crystal	9
ZX-81 Pocket Book	Phipps	*

Business

Accounts (Limited company)	Hestacrest	*
Accounts (Sole Trader)	Hestacrest	*
Business Bank Account	Transform	*
Critical Path Analysis	Hilderbay	6
Draft	Myrmidon	*
Mailing List	Hestacrest	*
Payroll	Hilderbay	*
Payroll	Soft Tech	*
Payroll	V&H Computing	*
Personal Banking System	Hilton	*
Purchase Ledger	Hestacrest	*
Sales Day Book	Transform	*
Sales Ledger	Hestacrest	*
Text	Contrast	8

Education

Binary Brains	Pooter	5
Calpac 1-2	Calpac	*
Four Rules of Number	Micro Master	*
Integration	University	8
Intermediate English 1-2	Rose	*
Intermediate Maths 1-2	Rose	*
Language Devel. Series	Glasson	*
Language Devel. Series	Micro Master	*
Linear Programming	University	*
Matrix Operations	University	7
O Level Chemistry	Calpac	*
O Level French Revision	Rose	*
O Level Maths Revision	Rose	*
Polynomials	University	*
Primary Arithmetic	Rose	*
Regression	University	*
Self-teach Program	Anvil	

Language

Forth	Sinclair	7
ZX Forth	Artic	8

Practical

Ephemeris	Bridge	7
Football Pools	Hartland	*
Poolster	Naigram	3

Puzzle

Nowotnik Puzzle	Phipps	*
Word Fit	Ram Writer	6

Simulation

Flight Simulation	Sinclair	6
Pilot	Hewson	7
Print Shop	CCS	*

Strategy

Airline	CCS	7
Auto Chef	CCS	7
Battleships	JRS	*
Conflict	Martech	7
Cyborg Wars	Stratagem	7
Dallas	CCS	6
Dictator	Bug-Byte	7
Farmer	CCS	*
Fighter Pilot	Digital Integration	5
Football Manager	Addictive Games	7
Fort Apache	Contrast	8
Galaxy Conflict	Martech	8
Great Britain Ltd	Hessel	*
Ocean Trader	Quicksilva	7
Pioneer Trail	Quicksilva	7
Racehorse Trainer	G Barker	6

Traditional

Do Not Pass Go	Work Force	*
Lynchmob	Bridge	6
Original Superchess	CP Software	*
Tai	PSS	*
Tenpin	Phipps	*
ZX 1K Chess	Artic	*
ZX Compendium	Mastervision	7
ZX-Chess I	Artic	*

Utility

Graphics	IPA	*
Graphics Toolkit	JRS	9
HI Resolution	CRL	6
Machine Code Test Tool	OCP	*
MCoder	PSS	8
Programme Enhancement Package	R and R	*
Renumber Delete	Work Force	*
Trace	Texgate	7
ZX Compiler	Silversoft	*
ZX Screenkit	Picturesque	*
ZX-81 Remload	Picturesque	*
ZX-Bug	Artic	*
ZX-sideprint	Microsphere	*
ZXAS	Bug-Byte	*
ZXDB	Bug-Byte	*

SPECTRUM 16K

Adventure

Android One	Vortex	*
Escape	New Generation	8
Mines of Saturn/Return to Earth	Mikro-Gen	*
Moria	Severn	*
Planet of Death	Artic	6
Secret Valley	New Soft	*
The Great Western	New Soft	*
Time Bandits	New Soft	*

Arcade

Aquarius	Bug-Byte	6
Arcadia	Beau Jolly	5
Arcadian	J K Greye	6
Assassin	Spectrasoft	*
Avenger	Abacus	5
Baron	Temptation	*
Base Invaders	Imagination	*
Black Hole	Quest	6
Blind Alley	Sunshine	7
Bug Blaster	Crystal	*
Cassette A	Orwin	*
Caterpillar	CDS	*
Cavern Fighter	Bug-Byte	4
Centi-Bug	dk'tronics	*
Children's Compendium	Dymond	*
City Defence	Mikro-Gen	*
Colour Clash	Romik	4
Cookie	Ultimate	*
Cosmic Guerilla	Crystal	8
Crazy Cranes	Voyager	5
Creepy Crawler	Mikro-Gen	*
Crevasse and Hotfoot	Microsphere	7
Cruising	Sunshine	4
Cyber Rats	Silversoft	7
Death Chase	Micromega	6
Demolition	Comp. Rentals	*
Destroyer	Winters	*
Di-lithium Lift	Hewson	3
Digger Dan	Ocean	*
Doombugs	Work Force	8
Dymonoids	Dymond	*
Earth Defence	Artic	5
Ed-On	Add-On	4
Eskimo Eddie	Ocean	*
Family Games Pack	Hornby	*
Fireflash	Abacus	5
Froggy	DJL	7
Fruit Machine	dk'tronics	6
Galactians	dk'tronics	*
Galactic Trooper	Romik	3
Galactic Warriors	Abacus	6
Galaxians	Artic	6
Ghost Hunt	PSS	*
Gnasher	Mastertronic	4
Gobble-a-Ghost	CDS	*

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Gobbleman	Artic	*
Godzilla and Martians	Temptation	7
Ground Attack	Silversoft	6
Gulpman	Campbell	*
Haunted Hedges	Micromega	6
Hopper	PSS	6
Horace and the Spiders	Sinclair	8
Horace Goes Skiing	Sinclair	8
Hungry Horace	Sinclair	8
Invasion Force	Artic	8
It's the Wooluf	Crystal	5
Jet Pac	Ultimate	8
Labyrinth	Axis	4
Leap Frog	CDS	*
Light Cycle	PSS	*
Luna Crabs	Micromega	7
Magic Meanies	CDS	2
Maze Chase	Hewson	8
Meteor Storm	Quicksilva	7
Meteoroids	dk'tronics	7
Meteoroids	Softek	6
Micro Mouse	Lothlorien	6
Millypede	Add-on	7
Mined Out	Quicksilva	7
Moon Buggy	Visions	6
Mr Wong's Loopy Laundry	Artic	6
Muncher	Silversoft	6
Nanas	Mikro-Gen	*
Orbiter	Silversoft	7
Ostron	Softek	*
Pengy	Micromania	4
Pitman Seven	Visions	*
Planetoids	Sinclair	8
Proteus	Abacus	5
Rapedes	Visions	*
Repulsar	Softek	*
Rider	Virgin	6
Road Toad	dk'tronics	7
Robot Panic	Soft Mill	1
Sam Spade	Silversoft	5
Santa	Artic	*
Sentinel	Abacus	7
Shark Attack	Romik	5
Sheer Panic	Visions	7
Slippery Sid	Silversoft	8
Space Fighter	Winters	*
Space Intruders	Quicksilva	7
Space Lanes	Cathedral	*
Space Raiders	Sinclair	6
Space Zombies	Mikro-Gen	*
Spec. Frogs/ Showdown	Artic	*
Spec. Gobbleman	Artic	*
Spec. Invaders	Artic	*
Spec. Invasion Force	Artic	*
Spec. Scramble	Work Force	7
Spectipede	Mastertronic	5
Spectral Invaders	Bug-Byte	8
Spectral Panic	Hewson	5
Spectres	Bug-Byte	6
Strike Four	Spectresoft	4
Styx	Bug-Byte	7
Sub	Romik	*
Tank Battle	dk'tronics	8
3D Monster Chase	Romik	3
Train Game	Microsphere	9
Trom	dk'tronics	4
Vortex	JK Greye	5
Winged Warlord	CDS	6
Wizard's Warriors	Abersoft	*
Yomp	Virgin	7

Business

Finance Manager	OCP	9
Home Computer Pack	SD Micro	*
Masterfile 16	Campbell	*
Matcalc	Work Force	*
Micropen	Contrast	*
Vu-Calc	Sinclair	7
Vu-File	Sinclair	8

Education

Alphabet	Widget	*
Alphabet Games	Sinclair	*
Apostrophe	Sinclair	7
Ballooning	Heinemann	*
Calpac 1-3	Calpac	*
Car Journey	Heinemann	*
Cargo	Sinclair	*
Chess Tutor	Artic	7
Counting	Starter Soft	*
Counting	Widget	*
Education One	Lerm	*
Educational	Startersoft	*
Firework Music	Soft Cottage	8
First Numbers	Collins	*
40 Education Games	Granada	*
Four Rules of Number	Micro Master	*
French Voc Test	Tutorial	*
Hidden Letters	Poppy	*
Hot Dot Spotter	Longman	*
Integration	University	8
Intermediate English 1-2	Rose	*
Know Your Tables	Collins	*
Language Devel. Series	Glasson	*
Language Devel. Series	Micro Master	*
Learn Basic	Logic 3	*
Learning Read 1	Poppy	*
Linear Programming	University	*
Marks Book	Lerm	*
Maths Invaders	Stell	*
Maths Tutor	AD Software	*
Matrix Operations	University	7
Money	Poppy	*
Night Sky	Bridge	*
O Level Maths	Homestudy	*
O Level Physics	Homestudy	*
Paddington's Shopping Mix-up	Collins	*
Pathfinder	Widget	*
Polynomials	University	8
Pre/early school cassettes	Essex	*
Primary Arithmetic	Rose	*
Punctuation Pete	Heinemann	*
Regression	University	8
Self-teach Program	Anvil	*
Shape Sorter	Widget	*
Special Agent	Heinemann	*
Spellbin	Startersoft	*
Use and Learn	Microl	8

Language

Beta Basic	Betasoft	9

Practical

Biorythms	Spectrasoft	*
Countries of the World	Hewson	8
Cycle Planner	Medidata	4
Map of the UK	Kuma	7
Shopping List	SD	*
Spectasort	Spectadraw	4

Puzzle

Flippit	Sinclair	7
Hanoi King	Contrast	7
Lojix	Virgin	3
Nowotnik Puzzle	Phipps	7
Quazar	Rose	4

Simulation

Air Traffic Controller	Hewson	6
Airliner	Protek	6
Golf	R & R	7
Golf	Virgin	7
NightFlite	Hewson	5
Print Shop	CCS	8
Pro-Golf	Hornby	7

Strategy

Auto Chef	CCS	*
Big Match Soccer	Winters	*
Dallas	CCS	6
Dictator	dk'tronics	*
Farmer	CCS	*
Football	Winters	*
Heathrow	Hewson	8
Las Vegas	Temptation	*
Quincy	Severn	*

Traditional

Backgammon	Hewson	*
Bridge Tutor	CP Software	8
Bridgemaster	Serin	9
Challenge	Temptation	*
Gambling Tape	Dymond	*
Las Vegas	Temptation	5
Odds-on	RSD	*
Othello	CP Software	*
Pinball	Winters	*
Pool	Bug-Byte	7
Reversi	Sinclair	8
Roulette	Newsoft	*
Solo Whist	Video Soft.	*
Spec. Microchess	Artic	*
Super Play I	Video	*
Tennis	Winters	*

Utility

Aspect	Bug-Byte	5
Audio Sonics	Work Force	4
Auto Sonics	Buttercraft	5
Basic Utilities	Jaysoft	6
Character Generator	Spectrasoft	*
Dietron	Custom	6
Disassembler	dk'tronics	7
Display	Work Force	*
Editor/Assembler	Picturesque	8
Extended Basic	CP Software	7
FP Compiler	Softek	9
Friendly Face	Monitor	7
Keysounder	S and G	*
Letterfont	Allanson	8
Machine Code Test Tool	OCP	7
Master Toolkit	OCP	7
MCoder	PSS	8
Micropen	Contrast	*
Print Utilities	Sinclair	7
Programmer's Dream	Work Force	8
Renumber Delete	Work Force	*
Slow Loader	ELR	9
Sound FX	dk'tronics	6
Spec. Bug	Artic	*
Spec. Editor/ Assembler	Picturesque	8
Spec. Monitor	Picturesque	7
Spectrum Super Toolkit	Nectarine	8
Spectsound	PDQ	2
Supercode	CP	8
Taswide-64	Tasman	*
Trace	Texgate	8
TT-S	Timedata	8
ZX Spectrum Assembler	McGraw Hill	4
ZXED	dk'tronics	*

SPECTRUM 48K

Adventure

Abyss	CCS	6
Ace in the Hole	Add-on	*
Adventure 1	Abersoft	6
Adventure Island	Contrast	*
Alchemist	Beau Jolly	7
Arcane Quest	Add-on	*
Atlas Assignment	Virgin	7
Black Crystal	Mastervision	7
Black Dwarf's Lair	New Soft	*
Black Planet	Phipps	7
Buffer Adventure	Buffer Micro	6
Byte	CCS	3
Castle	Bug-Byte	*
Castle Blackstar	SCR	7
Circus	Channel 8	8
Classic Adventure	Melbourne House	*
Colditz	Phipps	8
Colossal Caves	CP Software	8
Cry Wolf!	Add-on	*
Demon Lord	MCE	5
Detective	Arcade	7
Devils of Deep	Shepherd	*
Diamond Quest	CCS	4
Diamond Trail	Gilsoft	7
Dragonsbane	Quicksilva	6
Dungeon Master	Crystal Comp.	8
Dungeons of Doom	Temptation	3
Espionage Island	Artic	5
Everest Ascent	Sheperd	6
Eye of Bain	Artic	7
Fantasia Diamond	Hewson	7
Frog Face	Positive Image	7
Golden Apple	Artic	7
Gorgon	Phipps	*
Halls of Things	Crystal Comp.	9
Hampstead	Melbourne House	8
Here comes the sun	Alligata	7
Hobbit	Melbourne House	9
Hole	Add-on	*
Horror Atoll	Add-on	*
Inca Curse	Artic	6
Inferno	Shepherd	7
Invincible Island	Shepherd	8
Island	Crystal	4
Island	Virgin	7
Jericho Road	Shards	7
Jungle Adventure	CCS	4

Kentilla	Micromega	6
Knight's Quest	Phipps	6
Leopard Lord	Add-on	4
Lords of Midnight	Beyond	9
Lords of Time	Level Nine	8
Lost Over Bermuda	Add-on	*
Mad Martha	Mikro-Gen	7
Mad Martha II	Mikro-Gen	*
Mountains of Ket	Incentive	8
Murder at Manor	Gemtime	7
Mysterious Fairground	Buffer Micro	6
Odyssey of Hope	Martech	6
Oracle's Cave	Doric	8
Orb	Comp. Rentals	*
Orc Slayer	Gamma Software	5
Paradox	Runesoft	2
Perseus and Andromeda	Channel 8	7
Peter Pan	Hodder & Stoughton	6
Pimania	Automata	7
Quest	Hewson	7
Quetzalcoatl	Virgin	8
Roundsby Incident	Add-on	*
Satan's Pendulum	Minatron	7
Sherlock	Melbourne House	9
Ship of Doom	Artic	7
Solaris	Softel	*
Spoof	Runesoft	7
Superspy	Shepherd	5
System 15000	Craig Communications	9
Temple of Vran	Incentive	8
Terror from The Deep	Add-on	*
The Final Mission	Incentive	7
Time Quest	Mikro-Gen	*
Titanic	R&R	5
Transylvanian Tower	Shepherd	7
Twin Kingdom Valley	Bug-Byte	8
Urban Upstart	Shepherd	*
Valhalla	Legend	7
Vampire Village	Terminal	4
Velnor's Lair	Quicksilva	8
Volcanic Dungeon	Mastervision	6
War of the Worlds	CRL	4
Width of the World	Mosaic	4
Ziggarat of Dread	Add-on	*

Arcade

Ad Astra	Gargoyle Games	8
Adven. of a St Bernard	Mastertronic	7
Alcatraz Harry	Mastertronic	3
Android Two	Vortex	*
Ant Attack	Quicksilva	8
Antics	Bug-Byte	8
Arena 3000	Microdeal	5
Armageddon	Silversoft	3
Astroplaner	Romik	2
Atic Atac	Ultimate	8
Automania	Micro-Gen	6
Avalon	Hewson Consultants	9
Base Invaders	Work Force	6
Battle Zone	Quicksilva	5
Beach Head	US Gold	8
Bear Bovver	Artic	8
Bewarehouse	Positive Image	4
Birds and Bees	Bug-Byte	8
Black Hawk	Creative Sparks	7
Blade Alley	PSS	6
Blue Thunder	Foundry Systems	6
Brain Damage	Silversoft	*
Bubble Buster	Sinclair	5
Bubble Trouble	Arcade	*
Bugaboo	Quicksilva	7
Butterfly	Pulsonic	4
Buzz Off	Electric	5
Caesar the Cat	Mirrorsoft	7
Carnival	Eclipse	5
Carpet Capers	Termial	7
Cavelon	Ocean	7
Centipoid Plus 3	Orwin	5
Chequered Flag	Sinclair	8
Chinese Juggler	Ocean	5
Chuckie Egg	A & F	8
Chuckman	CCI/Add-on	8
Close-In	Pulsonic	4
Codename Mat	Micromega	9
Corridors of Genon	New Generation	9
Cruise Attack	Mikro-Gen	*
Crusoe	Automata	5
Cyber Zone	Crystal	*
Daley Thompson's Decathlon	Ocean	8
Dangermouse in Double Trouble	Creative Sparks	8
Death Chess 5000	Artic	7
Defenda	Interstella	2
Deffendar	Mikro-Gen	*
Defusion	Incentive	6
Defusion/Worms	K-Tel	3
Demon	Microcosm	*
Demon Chase	Mansfield	4
Deus Ex Machina	Automata	9
Devil Rides In	Mastertronic	7
Dimension Destructors	Artic	8
Dinky Digger	Postern	4
Dodge City	Phoenix	7
Dr Franky and the Monster	Virgin	6
Dragonfire	Cheetahsoft	5
Driller Tanks	Sinclair	3
Elektro Storm	PSS	*
Energy 30,000	Elm	3
Eric and the Floaters	Sinclair	6
Eskimo Eddie	Ocean	4
Frank N Stein	PSS	7
Fred	Quicksilva	6
Freez Beez	Silversoft	*
Froot Loop	NTD Software	5
Galaxy Attack	Sunshine	4
Ghost Rider	Positive Image	4
Gilligan's Gold	Ocean	6
Glug Glug	CRL	6
H. Dumpty and the F. Wuzzies	Artic	5
Harry Goes Home	Pulsonic	6
Hickstead	CCS	4
High Noon	Work Force	9
House of Living Dead	Phipps	*
Hunchback	Ocean	7
Invasion Body Snatch.	Crystal	9
Jack and the Beanstalk	Thor	5
Jackpot	Comp. Rentals	*
Jet Set Willy	Software Projects	9
Killer Knight	Phipps	5
Knight Rider	Hewson	*
Kokotoni Wilf	Elite	6
Kosmic Kanga	Micromania	5
Krakatoa	Abbex	8
Krazy Kong	PSS	*
Laser Zone	Quicksilva	8
Laserwarp	Mikro-Gen	6
Last Sunset Lattica	Arcade	*
Lazatron	Contrast	*
Les Flics	PSS	6
Loony Zoo	Phipps	6
Lunar Jetman	Ultimate	8
Manic Miner	Bug-Byte	9
Matrix	Salamander	7
Maze Death Race	PSS	*
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Metagalactic Llamas	Salamander	8
Mission Impossible	Silversoft	6
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Monkey Biznes	Artic	7
Moon Alert	Ocean	*
Moons of Tantalus	Cornhill	5
Mr Wimpey	Ocean	7
Mummy Mummy	Lothlorien	6
Munnery's Mergatroids	Abacus	6
Night Gunner	Digital Integration	6
1994	Visions	4
Olympimania	Automata	6
Orion	Software Projects	5
Pat the Postman	Mikro-Gen	*
Pedro	Beau Jolly	7
Penetrator	Melbourne House	7
Pi-Balled	Automata	7
Pi-Eyed	Automata	6
Pingo	Profisoft	6
Psi-Spy	Postern	5
Pssst	Ultimate	7
Psytron	Beyond	9
Pyjamarama	Mikro-Gen	8
Pyramid	Fantasy	8
Raider Cursed Mine	Arcade	*
Rapscallion	Bug-Byte	6
Reactor	Gemini	7
Rescue	Comp. Rentals	*
Rescue	Ocean	*
Revenge of the Killer Tomatoes	Visions	6
Rider	Virgin	6
River Rescue	Creative Sparks	3
Robot Riot	Silversoft	6
Rommels Revenge	Crystal	8
Sabre Wulf	Ultimate	8
Scuba Dive	Durrell	9
Security Shelter	Add-on	*
Skull	Games Machine	5
Snowball	Level 9	9
Sorcery	Virgin	7
Space Station Zebra	Beyond	6
Spectron	Virgin	6
Spellbound	Beyond	7
Splat	Incentive	8
Stagecoach	Creative Sparks	7
Stop the Express	Sinclair	8
Strangeloop	Virgin	9
Submarine Strike	Pulsonic	6
Tank Trax	Mastertronic	3
Terrahawks	CRL	5
The Guardian	PSS	6
The Pyramid	Fantasy	7
The Snowman	Quicksilva	8
3D Bat Attack	Cheetahsoft	6
3D Lunattack	Hewson	6
3D Seiddab Attack	Hewson	5
3D Star Wars	Add-on	1
3D Tank Duel	Real Time	6
3D Tunnel	New Generation	9
Tiler Tim	Microwish	6
Time Gate	Quicksilva	8
Timebomb	CDS	7
Tobor	Add-on	7
Tornado Low Level	Vortex	8
Tranz Am	Ultimate	*
Trashman	New Generation	8
Travel with Trashman	New Generation	7
Traxx	Quicksilva	7
Tribble Trubble	Software Projects	8
Trom	dk'tronics	4
Tutankhamun	Micromania	8
Two-Gun Turtle	Lothlorien	7
Warlock of Firetop Mountain	Penguin	*
Wheelie	Microsphere	7
Worm Attack	Pulsonic	2
Worse Things Happen at Sea	Silversoft	7
Wrath of Magra	Mastervision	8
Xadom	Quicksilva	4
Zig-Zag	dk'tronics	7
Zipper Flipper	Sinclair	4
Zombie Zombie	Quicksilva	7

Business

Account Management System	Fulwood	*
Accounts (Limited Company)	Hestacrest	*
Accounts (Sole Trader)	Hestacrest	*
Address File	SD Micro	*
Address Manager	OCP	7
Bank Account System	K Gouldstone	8
Bank Verifier	SD Micro	*
Business Bank Account	Transform	*
Cash Controller	Shepherd	7
Collector's Pack	Sinclair	7
Critical Path Analysis	Hilderbay	*
Database	Microl	7
DIY Book-keeping	RAMTOP	*
Heathplanner	Heath Computing	7
Home Budget	Kuma Computers	5
Investment, Insurance, Information	Inform	5
Invoicing/Accounting	Transform	8
Keyfile	Keysoft	7
Masterfile	Campbell	8
Micropen	Contrast	5
Money Manager	Creative Sparks	6
Multi-File	ISP	6
Omnicalc	Microsphere	9
Payroll	Hilderbay	9
Payroll	Transform	*
Payroll	V&H Computing	*
Personal Banking System	Hilton	*
Personal Financ. Management Syst.	Fulwood	*
Sales Day Book	Transform	*
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Small Business Accounts	Sinclair	*

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Spreadsheet	Microl	7
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Stock Control	Kemp	*
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Tasword II	Tasman	9
Utility File	SD Micro	*
Word Processor	Microl	*
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Education

ABC Liftoff	Longman	*
Angle	Chalksoft	5
Angle Turner	Arnold Wheaton	7
Astro Maths	Scisoft	6
Blockbuster	Compusound	7
Castle	L'Ensouleiado	7
Castle of Dreams	Widgit	7
Castle Spellerous	Sinclair	8
Chess Tutor 1	Sinclair	7
Cortes	L'Ensouleiado	6
Countabout	Longman	*
Dyslexia Beater	Dunitz	8
Eiffel Tower	Chalksoft	6
Electronic Learner's Guide No. 1	ETST	6
French is Fun	CDS	5
French Mistress	Kosmos	*
French Voc Test	Tutorial	*
German is Fun	CDS	8
German Master	Kosmos	*
Guitar Tutor 1	Harlequin	*
Guitar Tutor 2	Harlequin	*
Handwriting	Chalksoft	*
Highway Code	Learning Systems	6
Hotline	Chalksoft	5
Humpty Dumpty	Widget	8
Inkosi	Chalksoft	5
Jungle Jumble	Clever Cloggs	*
Jungle Maths	Scisoft	*
Learn to Read 1-5	Sinclair	7
Letters and Numbers	Jimjams	*
Linkword	Silversoft	6
Look Sharp	Mirrorsoft	7
Magnets	Sinclair	*
Make-a-Chip	Sinclair	*
Mansfield Park	Sussex	7
Mathskills II	Griffin	7
MDA-PCSS	MDA Assoc.	7
Model Maths	Jive	*
Mr T's Measuring Games	Ebury	7
Mr. Men	Mirror	*
Musicmaster	Sinclair	6
Nineteenth C. England	Sussex	8
O Level Chemistry	Calpac	*
O Level Physics	Think Tank	*
Party Time	C. Tutor	*
Pathfinder	Widget	7
Pirate	Chalksoft	7
Quick Thinking	Mirrorsoft	*
Sequences	Chalksoft	5
Spanish Gold	Chalksoft	*
Speak and Spell	S and G	*
Speech Marks	Sinclair	7
Spelling Bee	Image Systems	5
Star Reader	Scisoft	*
Startrucker	Widget	7
Teacher Data	B Farris	8
Tense French	Sulis	7
Time Traveller	Willey	*
Tuner	Soft Cottage	*
Whizz Kid	Comp. Tutor	*
Wizard Box	Scisoft	*
Words and Pictures	Chalksoft	6
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Forth	Melbourne House	9
Forth	Sinclair	7
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Hisoft C	Hisoft	9
Logo	Sinclair	9
Micro Prolog	Sinclair	8
Pascal Compiler	Hi-Soft	*
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Spec. Forth	Abersoft	9
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Practical

Astronomer	CP Software	7
Beamscan	Beamscan	9
Computer Cookbook	Bug Byte	5
Cricket Averages	Spartan CC	7
Diet	dk'tronics	*
Diet Master	Diet Master	6
Dietician	Keysoft	4
Engine Diagnostic	Spectrasoft	*
First Aid	Eastmead	4
Football Pools	Hartland	*
How Long have you got?	Eastmead	6
I Ching	Salamander	7
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Personal Reminder	SD Micro	*
Spectadraw 2	McAlley	*
Star Gazer	CRL	8
The Complete Guide to Medicine	Eastmead	4
Vega-Table	Vega	7
World Info	Wimsoft	*

Puzzle

Arcturus	Visions	7
Computaword	Work Force	2
Flix	Softricks	7
Hanoi King	Contrast	*
Hareraiser	Haresoft	3
Jumbly	dk'tronics	*
Mazecube	PAL	6
Stuart Henry's Pop Quiz	Bellflower	7
3D Strategy	Quicksilva	8

Simulation

Ashes	Pulsonic	7
Combat Lynx	Durrell	8
Cricket Captain	Allanson	6
Fighter Pilot	Digital Integration	*
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Full Throttle	Micromega	8
Golf	dk'tronics	*
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Match Point	Sinclair	9
New Birkdale	Hornby	8
Olympics	CRL	6
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Test Match	Comp. Rentals	6
The Forest	Phipps	7
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Strategy

Airline	CCS	7
Angler	Virgin	6
Apocalypse	Red Shift	*
Battle 1917	CCS	8
Battle of Britain	Microgame	*
Brewery	CCS	8
British Lowland	CCS	*
Caribbean Trader	E. Midland	7
Conflict	Martech	*
Conquest	Cheetahsoft	6
Dix Mille	CCS	5
Fall of Rome	ASP	6
Football Manager	Addictive Games	7
Galaxy Conflict	Martech	8
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Gatecrasher	Quicksilva	7
General Election	Bug-Byte	1
Golf	Virgin	7
Great Britain Ltd	Hessel	7
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It's Only Rock 'n' Roll	K-Tel	5
Johnny Reb	Lothlorien	*
King Arthur	E. Midland	*
Millionaire	Incentive	7
Mugsy	Melbourne House	8
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1984	Incentive	7
Oligopoly	CCS	7
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Ramopoly	J Fletcher	*
Roulette	Dymond	*
Scrabble	Sinclair	8
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Super Bridge	Buffer Micro	7
Superchess II	CP Software	8
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The Turk	OCP	8
Voice Chess	Artic	9
Yahtzi	Work Force	*
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ZX Reversi	CP Software	7
ZX-Chess II	Artic	*

Utility

Allsort S-1	A Firminger	7
Assembler	Artic	6
Beyond Basic	Sinclair	5
Building Price	J Redman	6
Cartoon Animation	Fowler	*
Character Generator	ISP	8
Compiler	Softek	6
Composer	Contrast	2
DLAN	Campbell	*
FP Compiler	Softek	9
Games Designer	Quicksilva	7
HURG	Melbourne House	8
Keyword Extension	Timedata	8
Linked Software: Information Handling	McGraw Hill	3
List File	SD Micro	*
Make Music	Buffer Micro	8
Melbourne Draw	Melbourne House	7
Monitor/Diss.	Sinclair	8
Music Maker	Bellflower	3
Paintbox	Print & Plotter	8
Print Utilities	Sinclair	7
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Trans Express	Romantic Robot	8
Vu3D	Sinclair	8
White Lightning	Oasis	9
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Software Publishers

A & F Software, Unit 8, Canalside Industrial Estate, Woodbine Street East, Rochdale, Lancashire OL16 5LB
Abacus Software, 21 Union Street, Ramsbottom, Nr Bury, Lancashire
Abbex, 20 Ashley Close, Manor Hall Drive, London NW4
Abersoft, 7 Maesfallen, Bow Street, Aberystwyth, Wales
Add-on Electronics, Units 2,3 & 4, Shire Hill Industrial Estate, Saffron Walden, Essex CB11 3AQ
Addictive Games, 7a Richmond Hill, Bournemouth BH2 6HE
ADS, 8 Bronchurch Street, Portsmouth, Hampshire PO4 8RY
Allanson Computing, 77 Chorley Road, Adlington, Chorley, Lancashire PR6 9LH
Alligata Software, 1 Orange Street, Sheffield S1 4DW
APS, 1 Golden Square, London W1
Arcade Software, Technology House, 32 Chislehurst Road, Orpington, Kent BR6 0DG
Arnold Wheaton, Parkside Lane, Dewsbury Road, Leeds LS11 5TD
Artic Computing, Main Street, Brandesburton, Driffield YO25 8RG
Automata UK, 27 Highland Road, Portsmouth, Hampshire P04 9DA
Axis, 71 Brookfield Avenue, Loughborough, Leicestershire LE11 3LN
Beau-Jolly, 19A New Broadway, Ealing, London W5
Bellflower Software, 6 Rosewood Avenue, Greenford, Middlesex UB6 7QP
Betasoft, 92 Oxford Road, Moseley, Birmingham B13 9SQ
Beyond Software, 8 Herbal Hill, London EC1
Bridge Software, 36 Fernwood, Marple Bridge, Stockport, Cheshire SK6 5BE
Bridgemaster, Sandymouth, Beeches Road, Farnham Common, Buckinghamshire SL2 3PS
Buffer Micro, 310 Streatham High Road, London SW16
Bug-Byte, Mulberry House, Canning Place, Liverpool L1 8JB
Calpac Computer Software, 108 Hermitage Woods Crescent, St Johns, Woking, Surrey
Campbell Systems, 57 Trap's Hill, Loughton, Essex IG10 1TD
CCS, 14 Langton Way, Blackheath, London SE3 7TL
CDS Micro Systems, Silver House, Silver Street, Doncaster, South Yorkshire DN1 1HL
Century Communications, Portland House, 12-13 Greek Street, London W1V 5LE
Chalksoft, 37 Willowslea Road, Northwick, Worcester
Channel 8, 51 Fishgate, Preston, Lancashire PR1 8BH
Cheetahsoft, 24 Ray Street, London EC1R 3DJ
Clever Clogs, Argus Press Software Group, 1 Golden Square, London W1R 3AB
Collins, 18/20 Stephenson Way, North Gower Street, London NW1 2DX
Compusound, 32/33 Langley Close, Redditch, Worcester B98 0ET
Computatutor, 3 Thalia Close, Greenwich, London SE10 9NA
Contrast Software, Warren Road, Liss, Hampshire GU33 7DD
Cornhill Software, 2 Penrith Way, Aylesbury, Buckinghamshire HP21 7JZ
CP Software, 1 Glebe Road, Uxbridge, Middlesex UB8 2RD
Craig Communications, PO Box 46, Basingstoke, Hampshire
Creative Sparks, Thomson House, 296 Farnborough Road, Farnborough, Hampshire
CRL, 9 King's Yard, Carpenters Road, London E15 2HD
Cross Software, 36 Langford Crescent, Barnet, Hertfordshire EN4 9EH
Crystal Computing, 2 Ashton Way, East Herrington, Sunderland SR3 3RX
CSP Systems, 213 Stainbeck Road, Leeds
D Pinch, 72 Norwood Crescent, Coldbrook, Barry, South Glamorgan
Digital Integration, Watchmoor Trade Centre, Watchmoor Road, Camberley, Surrey GU15 3AJ
DJL, 9 Tweed Close, Swindon, Wiltshire SN2 3PU
dk'tronics, Unit 6, Shire Hill Ind Est, Saffron Walden, Essex CB11 3A
Domark, 228 Munster Road, London SW6
Dorcas Software, 3 The Oasis, Glenfield, Leicester
Doric Computer Services, 3 The Oasis, Glenfield, Leicester LE3 8QS
Dunitz, 154 Camden High Street, London NW1 0NE
Durrell Software, Castle Lodge, Castle Green, Taunton TA1 4AB
Dymond Software, 22 Hospital Road, Annan, Dumfriesshire DG12 5HP
Dynavision Production Studio, PO Box 96, Luton LU3 2JP
East London Robotics, St Nicholas House, The Mount, Guildford, Surrey GU2 5HN
Eastmead, Eastmead House, Lion Way, Camberley, Surrey GU16 5EZ
Ebury Press, Humphrey Bull & Barker, 62 Dean Street, London W1V 5HG
Electric Abacus, Oaklands House, Solartron Road, Farnborough, Hants
Elite Systems, 55 Bradford Street, Walsall, West Midlands WS1 3QD
Elm Computers, 59 Bateman Road, East Leake, Loughborough, Leicestershire LE12 6NN
Fantasy Software, Fauconberg Lodge, 27a St Georges Road, Cheltenham
Fawkes Computing, 41 Wolfridge Ride, Alveston, Bristol BS12 2RA
Felix Software, 19 Leighton Avenue, Pinner HA5 3BW
Fulwood, 20 Templestowe Hill, Whitkirk, Leeds LS15 7EJ
Games Machine, 40 Fretherne Road, Welwyn Garden City, Hertfordshire AL8 6NU
Gamma Software, 12 Milverton Road, London NW6 7AS
Gargoyle Games, 4 North Western Arcade, Birmingham BS 5LH
Gavin Barker, 12 Feming Field, Shotton Colliery, County Durham DH6 2JF
Gemini Software, 18a Littleham Road, Exmouth, Devon EX8 2QG
Gemtime Software Division, 16 Ben Ledi Road, Kirkcaldy, Fife KY2 5RP
Gilsoft, 30 Hawthorn Road, Barry, South Glamorgan, South Wales
Gouldstone, 45 Burleigh Avenue, Wallington, Surrey SM6 7UG
Granada Publishing, 8 Grafton Street, London W1X 3LA
Gremlin Graphics, Alpha House, 10 Carver Street, Sheffield S1 4FS
Griffin & George, Frederick Street, Birmingham B1 3HT
Haresoft, PO Box 365, London NW1
Harlequin Software, 43 Osprey Park, Thornbury, Bristol BS12 1LY
Hartland Software, 32 Ivor Place, London NW1 6DA
Heath Computing, 7 The Meadows, Flackwell Heath, Buckinghamshire HP10 9LX
Heinemann Computer Education, 22 Bedford Square, London WC1B 3HH
Hessel, 15 Lythan Court, Cadwell Crescent, Sunningdale, Berkshire
Hestacrest, PO Box 19, Leighton Buzzard, Bedfordshire LU7 0DG
Hewson Consultants, 56B Milton Trading Estate, Milton, Abingdon
Hilderbay, 8/10 Parkway, Regents Park, London NW1 7AA
Hilton Computer Services, 14 Avalon Road, Orpington, Kent
Hisoft, 180 High Street, Dunstable, Bedfordshire LU6 1AT
Hodder & Stoughton, PO Box 6, Dunton Green, Sevenoaks, Kent TN13 2XX
Homestudy Ltd, Treleigh Woods Farm, Treleigh, Redruth, Cornwall TR16 4AW
Hornby Software, 21 Penfold Hill, Leeds LS15 0PW
Image Systems, 34 Lynwood Drive, Worcester Park, Surrey KT4 7AB
Incentive, 54 London Street, Reading, Berkshire RG1 4SQ
Inform Software, 3 Treesdale Close, Birkdale, Southport PR8 2EL
Interstella Software, 82 New Forest Drive, Brockenhurst, Kent
ISP Marketing Ltd, Crown Hill, 38B High Street, Godalming, Surrey GU7 1DZ
JK Greye Software, 16 Park Street, Bath, Avon BA1 2TE
JRS Software, 19 Wayside Avenue, Worthing, Sussex BN13 3JH
K-Tel International (UK), 60 Western Avenue, London W3 0TU
Kemp, 43 Muswell Hill, London N10 3PN
Keysoft, 6 Bruce Grove, Tottenham, London N17
Kosmos Software, 1 Pilgrims Close, Harlington, Dunstable, Bedfordshire LU5 6LX
Kuma Computers, 12 Horseshoe Park, Pangbourne, Berkshire RG8 7JW
Learning Systems, 11 Warwick Court, Princes Drive, Harrow, Middx HA1 4UB
Legend, PO Box 435, London E4 7LX
Lerm, 10 Brunswick Gardens, Corby, Northamptonshire
Level Nine, 229 Hugenden Road, High Wycombe, Buckinghamshire HP13 5PG
Logic 3, Unit 18, Wye Ind Est, London Road, High Wycombe, Buckinghamshire
Longman, Longman Group, Longman House, Harlow, Essex CM20 2JE
Lothlorien, 56a Park Lane, Poynton, Stockport, Cheshire SK12 1RE
Manor Software, 24 Manor Gardens, London SW20
Martech Games, 9 Billingburgh Road, Eastbourne, East Sussex BN20 8LY
Mastertronic, (as for Mastervision)
Mastervision, Park Lorne, 111 Park Road, London NW8 7SL
McAlley, 1 Cowleaze, Chinnor, Oxfordshire OX9 4TD
McGraw Hill, Shoppen Hangers Road, Maidenhead, Berkshire
Medidata, PO Box 26, London NW9 9BW
Melbourne House, Castle Yard House, Castle Yard, Richmond TW10 6TF
Metacomco, 26 Portland Square, Bristol BS2 8RZ

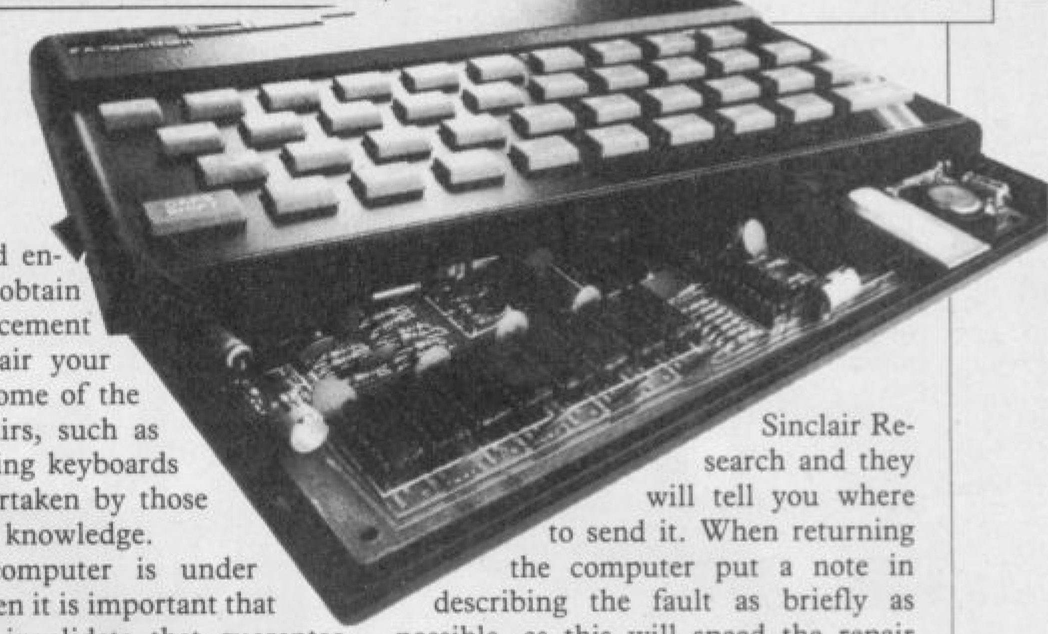
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Micro Dealer UK, Unit 6, Marlborough Road Trading Estate, Lattimore Road, St Albans, Hertfordshire
Micro Wish, PO Box 15, Colne, Lancashire BB8 9DB
Microbyte, 19 Worcester Close, Lichfield, Staffordshire
Microcosm, 68 The Glade, Clayhall, Ilford
Micromania, 14 Lower Hill Road, Epsom, Surrey KT19 8LT
Micromega, 230/236 Lavender Hill, London SW11
Microsphere, 72 Roseberry Road, London N10 2LA
Mikro-Gen, 44 The Broadway, Bracknell, Berkshire RG12 1AG
Minatron Computing, 34 Pinewood Close, Westbury on Trym, Bristol BS9 4AJ
Mirrorsoft, PO Box 50, Bromley, Kent BR2 9TT
Monitor Software, PO Box 442, London NW7 2JF
Mosaic, 187 Upper Street, London N1 1RQ
MW Gamesworld, 12 Lawnswood Avenue, Chasetown, Walsall WS7 8YD
Myrmidon Software, PO Box 2, Tadworth, Surrey KT20 7LU
Naigram Software, c/o Soho Synth House, 18A Soho Square, London W1V 5FB
Nectarine, 837 Yeovil Road, Slough SL1 4JH
New Generation Software, FREEPOST, Bath BA2 4TD
Newsoft, 12 White Broom Road, Hemel Hempstead, Hertfordshire
NTD Software, 19 Radipole Road, London SW6
Oasis Software, 9a Alexandra Parade, Weston-Super-Mare, Avon BS23 1QT
Ocean Software, 6 Central Street, Manchester M2 5NS
OCP, 4A High Street, Chalfont St Peter, Buckinghamshire SL9 9QB
Orwin Software, 26 Brownlow Road, Willesden, London NW10 9QL
Penguin, 536 King's Road, London SW10
Phipps Associates, 172 Kingston Road, Ewell, Surrey
Phoenix Publishing, 14 Vernon Road, Bushey, Hertfordshire WD2 2JL
Picturesque, 6 Corkscrew Hill, West Wickham, Kent BR4 9BB
Pooter Games, 24 Parsloes Avenue, Dagenham RM9 5NX
Poppysoft, The Close, Common Road, Headley, Newbury, Berkshire
Positive Image Software, 129 Dumbarton Road, Glasgow
Postern Software, PO Box 2, Anderovers Ford, Cheltenham, Gloucester GL54 5SW
Print 'n' Plotter Products, 19 Borough High Street, London SE1 9SE
Protek Computing, 1a Young Square, Brucefield Ind Park, Livingston, West Lothian
PSS, 452 Stoney Stanton Road, Coventry CV6 JDG
Pulsonic, Warwick Distribution Ltd, 3 Standard Road, Park Royal, London NW10 6EX
Quest International Computer Systems, Gillingham House, 38-44 Gillingham Street, London SW1
Quicksilva, Palmerstone Park House, Southampton, Hampshire S01 1LL
R and R, 34 Burton Road, Gloucester GL4 0LE
RAM Writer, 3 Vumba House, 2 Cedar Gardens, Sutton, Surrey
Ramtop Services, 5 Rue D'Artois, 75008, Paris, France
Red Shift, 12c Manor Road, Stoke Newington, London N16 5SA
Romantic Robot, 113 Melrose Avenue, London NW2 4LX
Romik Software, 272 Argyll Avenue, Slough SL1 4HE
Rose Software, 148 Widney Lane, Solihull, West Midlands
Runesoft, Charnwood House, Crossgate Drive, Nottingham NG2 TLW
Salamander Software, 27 Ditchling Rise, Brighton, East Sussex BN1 4QL
Scisoft, 5 Minster Gardens, Newthorpe, Eastwood, Nottingham NG16 2AT
SCR Adventures, 190 Shelbourne Road, Tottenham, London
SD Microsystems, 9 Cadwell Court, Hitchin, Hertfordshire SG4 0AQ
Selec Software, 37 Councillor Lane, Cheadle, Cheshire
Serim Software, Freepost, Dept SU7, PO Box 163, Slough, Berkshire SL2 3YY
Shards, Suite G, Roycraft House, 15 Linton Road, Barking, Essex
Shepherd Software, Elm House, 23–25 Elmshott Lane, Chippenham, Slough, Berkshire
Shiva Publishing, 64 Welsh Row, Nantwich, Cheshire CW5 5BR
Silversoft, London House, 271/273 King Street, London W6 9LZ
Sinclair Research, 6 Kings Parade, Cambridge
Soft Cottage, 19 Westfield Drive, Loughborough, Leicestershire LE11 3QJ
Soft Tech, 31 Lampits, Hoddesdon, Hertfordshire
Softek International, 12/13 Henrietta Street, Covent Garden, London WC2E 8LH
Softel, 5 Durward Drive, Glenrothes, Fife KY6 2LB
Software Farm, 155 White Ladies Road, Clifton, Bristol BS8 2RG
Software Projects, Bear Brand Complex, Allerton Road, Woolton, Liverpool, Merseyside L25 7SE
Spartan CC, 29 Feltham Avenue, East Moseley, Surrey KT8 9BJ
Spectadraw, 1 Cowleaze, Chinnor, Oxfordshire OX9 4TD
Spectrasoft, Capital House, Market Place, London W3 6AL
Startersoft, 32 Parkfields, Chippenham, Wiltshire
Stell Software, 36 Limefield Avenue, Whalley, Lancashire BB6 9RJ
Stratagem Cybernetics, 286 Corbin Place, 2E, Brooklyn, New York 11235
Sulis Software, 4 Church Street, Abbey Green, Bath BA1 1FP
Sunshine Books, 12/13 Newport Street, London WC2
Sussex Publication, Townsend Poulshot, Devizes, Wiltshire SN10 1SD
Tasman Software, 17 Hartley Crescent, Leeds LS6 2LL
Temptation Software, 27 Cinque Ports Street, Rye, East Sussex
Terminal Software, Derby House, Derby Street, Bury BL9 0NW
Texgate, 14 Brook Lane, Corfe Mullen, Wimbourne, Dorset
Think Tank, 35 Wellington Road, Wimbledon Park, London SW19
Thor Computer Software, Erskine Industrial Estate, Liverpool L6 1AP
Timedata, 16 Hemmells High Road, Laindon, Basildon, Essex SS15 6ED
Transform, 41 Keats House, Porchester Mead, Beckenham, Kent
Tutorial Software, 'Vilands', Glasllwch Lane, Newport, Gwent NP1 3PS
Ultimate Play the Game, The Green, Ashby de la Zouche, Leicestershire LE6 5JU
Unicorn Micro Systems, 312 Charminster Road, Bournemouth BH8 9RT
University Software, 29 St Peters Street, London N1
US Gold, Unit 24, Tipton Trading Estate, Bloomfield Road, Tipton, West Midlands DY4 9AH
Vega Space Systems, 28 Watford Road, St Albans AL1 2AJ
Virgin Games, 2–4 Vernon Yard, London W11
Visions, 1 Feldgate Mews, Studlands Street, London W6
Vortex Software, 280 Brooklands Road, Brooklands, Manchester M23 9HD
Widget Software, 48 Durham Road, London N2 9DT
Wilcox Software, Station Road, Walsall WS7 6JZ
Winters, 24 Swannington Close, Cantley, Doncaster, South Yorkshire
Woosoft, 5 Andrews Close, Robertsbridge, Sussex TN32 5PB
Workforce, 140 Wilsden Avenue, Luton, Bedfordshire
Wyvern Software, 2 Princes Building, George Street, Bath BA1 2ED

Sinclair spares and repairs



IF, LIKE MANY other Spectrum owners, you find one day that your computer has died, you will have a major problem on your hands. Phoning the Sinclair Research customer relations department in Camberley will not help very much either.

If your electronics knowledge is limited, then you will decide to send your Spectrum to one of the companies who specialise in repairing computers. If you have a good working knowledge of electronics then the addresses listed below should enable you to obtain most replacement parts to repair your computer. Some of the simpler repairs, such as those involving keyboards can be undertaken by those with limited knowledge.

If your computer is under guarantee then it is important that you do not invalidate that guarantee. Talk to the customer service division at Sinclair Research and they will tell you where to send it. When returning the computer put a note in describing the fault as briefly as possible, as this will speed the repair process.

Suppliers of Sinclair parts:

Adaptors and Eliminators, 14 Thames Street, Louth, Lincolnshire. (050782) 8011. Spectrum and ZX-81 power supplies.
ASTEC (UK), 16 Albury Close, Reading, Berkshire. (0734) 53067. Supplies modulators for all countries PAL, NTSC, SECAM.
CPC, 194-200 North Road, Preston, Lancashire. (0772) 555034. Supplies all parts for Spectrum, ZX-81, ZX printer, ZX RAM pack including all case parts, power supplies and keyboard parts. Probably the best place to get ULA, ROM, case parts and keyboard.
Ferranti Semiconductors, Computer Road, Hollinwood Avenue, Oldham, Lancashire. (061) 682 6844, (061) 624 0515/6661. Supplies Spectrum and ZX-81 ULA.
Maplin Electronics, Southend on Sea, Essex. (0702) 552961. Supplies general components and data and technical books.
National Semiconductors (UK) Ltd, 301 Harpur Centre, Horne Lane, Bedford. (0234) 47147. Supplies Spectrum RAM/74LS series TTL; LM 1889 video chip.
NEC (UK) Ltd, Block 3, Carfin Industrial Estate, Motherwell. (0698) 73221. Supplies Spectrum ROM and RAM/74LS TTL; Z80A.
Sinclair Research Ltd, Camberley, Surrey. (0276) 685311.
Texas Instruments, Manton Lane, Bedford, Bedfordshire. (0234) 223000, (0234) 211655. Supplies RAM 4116, 4532, 4164, 74LS TTL (Spectrum).
Timex Corporation, Camperdown Plant, Harrison Road, Dundee, Tayside. (0382) 819211. Makers of Spectrum, ZX-81, Printer, Interface one, Microdrives, RAM Pack. Repair and service for Sinclair.
Verran (Computerfix), Units 2H & 2J, Albany Park, Frimley Road, Camberley, Surrey. (0276) 66266. Repairs Spectrums and ZX-81.
Zilog (UK) Ltd, Zilog House, 45-53 Moorbridge Road, Maidenhead, Berkshire. (0628) 39200. Supplies Z80A.

Component companies

SOME OF THE large companies mentioned above do not like dealing directly with the public. The following is a list of component companies which should be happy to deal with you. Most will have catalogues available and will supply data sheets for their products on demand.

These firms are only distributors and they do not make components. If you have a problem with a particular device contact the manufacturer as listed above because not many of the distributors can answer technical questions; RS Components, Farnell, Ambitt and Hawkes may do. Anyone needing NEC parts should phone them direct and ask for some distributors dealing with them.

Abacus Electronics, Kennet House, Pembroke Road, Reading, Berkshire. (0734) 33311. Makes dealt with: National Semiconductors, SGS.
Access Electronic Components Ltd, Austin House, Bridge Street, Hitchen, Hertfordshire. (0462) 57244. Makes dealt with: National Semiconductors.
Alpha Electronic Components Ltd, 66 Wilbury Way, Hitchin, Hertfordshire. (0462) 57244. Makes dealt with: National Semiconductors.
AM Lock Distribution Ltd, Nevill Street, Middleton Road, Oldham, Lancashire. (061) 652 0431. Makes dealt with: Motorola, Mostek.
Anzac Components Ltd, Burnham Lane, Slough, Buckinghamshire. (06286) 4701. Makes dealt with: Hitachi.
Axion Electronics Ltd, Unit F, Turnpike Road, Cressex Industrial Estate, High Wycombe, Buckinghamshire. (0494) 442181. Makes dealt with: Motorola.
BA Electronics Ltd, Millbrook Road, Yate, Bristol. (0454) 315824. Makes dealt with: Texas Instruments.
Celdis Ltd, 37-39 Loverrock Road, Reading, Berkshire. (0734) 585171. Makes dealt with: Motorola, Mostek.
Crellon Electronics Ltd, 380 Bath Road, Slough, Berkshire. (06286) 4434. Makes dealt with: Motorola, SGS, Zilog.
Dialogue Distribution Ltd, Watchmore Road, Camberley, Surrey. (0276) 682001. Makes dealt with: Hitachi.
DTV Group, 10-12 Earnest Avenue, West Norwood, London SE27. (01) 670 6166. Makes dealt with: National Semiconductors.
Farnell Electronic Components Ltd, Canal Road, Leeds. (0532) 636311. Makes dealt with: Hitachi, National Semiconductors.
Hawke Electronics Ltd, Amotex House, 45 Hanworth Road, Sunbury on Thames, Middlesex. (01) 979 7799. Makes dealt with: Motorola, Texas Instruments. Will answer technical queries.
Hill Electronics (NI) Ltd, 290 Antrim Road, Belfast, Northern Ireland. Makes dealt with: Mostek.
ITT Multicomponents, Edinburgh Way, Harlow, Essex. (0279) 442971. Makes dealt with: Motorola, National Semiconductors, SGS, Texas Instruments and Hitachi.
Macro Marketing Ltd, Burnham Lane, Slough, Berkshire. (06286) 4422. Makes dealt with: Motorola, National Semiconductors, Zilog, Texas Instruments.
Quarndon Electronics Ltd, Slack Lane, Derby. (0332) 32651. Makes dealt with: Texas Instruments.
STC Electronics, Edinburgh Way, Harlow, Essex. (0279) 26777. Makes dealt with: Motorola, National Semiconductors, SGS, Texas Instruments and Hitachi.

Computer parts

Z80A: Zilog, SGS, NEC (Spectrum/ZX-81).
ULA: Ferranti (Spectrum/ZX-81).
ROM: Hitachi, NEC (Spectrum), Mostek, Motorola (ZX-81).
RAM: 4116 type — NEC, National Semiconductors, Texas Instruments, ITT (Spectrum). 4532 type — Texas Instruments, OKI (Manhattan Skyline) (Spectrum). 2114 type — Motorola, NEC (ZX-81). 4118 type — Mostek (ZX-81). 2K type — Mostek, Toshiba, Motorola, Texas Instruments, NEC (ZX-81).
LM1889: ICI4 — National Semiconductors (Spectrum).
TTL: 74LS00/74LS32/74LS157 — Texas Instruments, SGS, Motorola, National Semiconductors, NEC.

The following are all used on the 48K Spectrum.

Regulator: LM7805 +5V Reg. — SGS, NEC, Texas Instruments, Motorola.
Crystals, Capacitors, Resistors, Diodes, Sockets: available through general component suppliers.
Modulator: UM1233 Astec (UK) Ltd.
Leads: available at most TV/electrical shops.
Case parts: Sendale Plastics.
Keyboard: CPC.

BUMPER 20 PAGE ISSU
CHRISTMAS COMPETITION

LOGIC 3

Spectrum Club

BRITAIN'S No.1 SOFTWARE CLUB

WINTER ISSUE 1984/85

WIN A MICRODRIVE



Christmas Competition

1st prize: ZX Microdrive & ZX Interface 1 (worth over £70)

2nd prize: Currah μSpeech Synthesizer (worth £29.90)

10 runner up prizes of free games software (each worth over £10)

To Celebrate the Christmas season Logic 3 are running a grand Christmas Competition with a ZX Microdrive and Currah μSpeech Synthesizer as first and second prizes.

The ZX Microdrive, complete with Interface 1, is undoubtably the ultimate Spectrum add-on allowing programs and data to be quickly saved and recalled. The Currch μSpeech is both powerful, featuring an infinite vocabulary, and easy to use.

To enter the competition carefully read the reviews in this catalogue then answer the questions in the Quiz and mail your answers to Logic 3. All entries received before 31st January will be eligible for the competition. Prizes will be awarded to the first 12 correct entries drawn.

Here's your chance to win these desirable Spectrum add-ons, but don't leave it too late, make sure, your entry reaches Logic 3 before the closing date!

CLUB SUCCESS

The Logic 3 Spectrum Club was launched in July, 1984 and has been an outstanding success. Already more than half-way to its target of 10,000 members in twelve months, the continuous growth of the club has kept Logic 3's staff working seven days a week just to keep up with demand.

Tony Toller, Logic 3's managing director and coordinator of the Club, explains its success as follows: "With other clubs once a person has joined there is no more reason for the club to try to support its members who each month *have* to purchase a certain number of products from a short list. Our Club is different. Members have no obligation to purchase *any* products from the club so the pressure is on us to choose only the best quality products and offer the best possible prices. We also take a lot of pride in publishing independent reviews on all the products we carry and if we do not like something about a product we are not afraid so say so."

Tony Toller's policy of offering Club members a real service rather than just running "yet another mail order business" is winning new members all the time. But size by itself is not the main objective "as we grow so we will be able to improve our service to members still further and perhaps, one day, develop the club catalogue into a proper magazine." With the Christmas edition of the catalogue already running at a bumber 20 pages containing reviews of more than 180 products that day may come quite soon!

LOGIC 3

Spectrum Club

The Logic 3 Spectrum Club has something for everyone: regular reviews, excellent savings on all the latest top quality games and educational software, and discounts on hardware.

NEW MEMBERS INTRODUCTORY OFFER

Join Logic 3 Spectrum Club *within 60 days* and benefit from our new members introductory offer to purchase our "Software Specials" at a huge discount.

MEMBERSHIP IS ONLY £3.00 PER YEAR

(Equivalent to only 25p per month)

TO JOIN FILL IN YOUR NAME AND ADDRESS ON THE ORDER FORM (OR ON A SEPARATE SHEET OF PAPER) AND SEND WITH YOUR £3.00 TO THE ADDRESS BELOW.

MEMBERSHIP DEPT.
THE LOGIC 3 SPECTRUM CLUB
MOUNTBATTEN HOUSE
VICTORIA STREET

INSIDE

- ★ **EDUCATION**
  A selection of the most effective educational progra... available. Designed for children from... age of 4 to 16.
- ★ **GAMES**
  The best games for the Spectrum selected by ou... review panel and rated according to: graphics, s... colour, originality and in...
- ★ **PROGRAMMING**
  The 'Learn BASIC' tutor... really show you how to... structured programs in... understand stages.
- ★ **UTILITIES**
  Design your own gam...
- ★ **HARDWARE**
  Some good deals in... and peripherals.

LOGIC 3' SOFTWA... PANEL

Neil Atkinson, pupil... Borlase School, spe... weekends in a shop... computer software... work as a journalis...

Andrew Goltz, dire... spent 6 years with... UK and Internatio... instigated Comm... 'Approved Produ... third party softw...

Bliss Healey, gra... School of Econ... translated busin... French, current... design of grap... software.

Tony Toller, di... former journa... business app... and co-ordina... software club...

c Attack



Machine: 48k
Joystick: Kempston and most others—redefineable keys
Category: Arcade Adventrue
Publisher: Ultimate

BONUS £3.45 PRICE

ice: £5.50 **Club price: £4.95**

uring your quest for The Golden ey of ACG you become trapped an evil haunted castle. As you ander around the castle's ancient ooms and passages you encounter rankenstein, Dracula and the Devil imself! As you move from room o room you try to ward off the houls and pick up any items which may be of use later.
A fast moving 'graphics only' adventure.

Ratings: /10
Graphics: 7
Sound: 6
Colour: 7
Originality: 9
Interest: 7
Order code: ATIAT

Avalon



Machine: 48k
Joystick: Kempston Sinclair Cursor
Category: Graphics/Adventure
Publisher: Hewson Consultants

Price: £7.95 **Club price: £6.75**

An amazing 3D arcade/adventure. Avalon features 223 rooms on eight levels, and over 100 characters. You control the "astral projection" of Meroc, a ghostly wizard figure who floats around in an eerie way. Your mission is to banish the Lord of Chaos who has terrorised peasants by stealing corpses of the dead. You will need various spells and skills which can be found in the rooms of the castle of the Lord of Chaos.
The screen display shows Maroc, the room that he is in, any magical objects, and also any of the 100 other characters. The room and larger magic objects are all drawn in 3D. To collect a magic object or spell you just guide Maroc over it. To cast a spell, use your joystick or keyboard to select the right spell from the spell scroll. Only certain spells will provide defence against certain enemies.
Avalon is a complex game, and you must read the instructions. The graphics are clear and well animated, and the sound is good. Plenty to keep you amused and intrigued for a long time. An original graphics adventure—recommended.

Deus Ex Machina



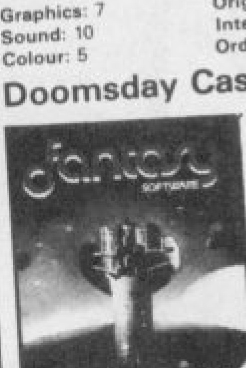
Machine: 48k
Joystick: No
Category: Strategy
Publisher: Automata

Price: £15.00 **Club price: £13.50**

The prospect of an all star cast performing in stereo sound, synchronised with a computer game and coming from a software house of such standing as Automata was pretty exciting. Perhaps that was the problem. With a lot of software there is such a build up that the product has to be incredible to live up to it all. Deus Ex Machina turned out to be a bit disappointing, but we'eve included it in our catalogue because because it's a 'first' and it's uniqueness makes it a must for collectors.
To play the game properly you need a tape recorder (preferably stereo hi-fi) as well as your normal Spectrum kit. You load the program and play the audio tape, then there's a countdown routine to enable you to synchronise the start.
The basic theme is the story of life and its struggles. You start as a seed in the womb, progress to becoming and embryo, through birth, life and on into old age. The computer side consists of a number of arcade-style games where you're constantly having to fight off the problems of life, even to the end where you try tp stop your blood cells clotting. The audio tape tells the story and accompanies most of the games with songs.
The soundtrack would do credit to a West End musical, the computer games are average—there's no score so you can't tell how you're doing. Different? Yes. Interesting? Yes, if you're a Psychologist!

Ratings: /10
Graphics: 7
Sound: 10
Colour: 5
Originality: 10
Interest: 6
Order code: DEM

Doomsday Castle



Machine: 48k
Joystick: Kempston Fuller Sinclair Cursor
Category: Arcade/Adventure
Publisher: Fantasy

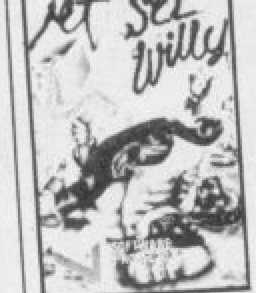
Price: £6.50 **Club price: £4.95**

Another high quality arcade adventure from Fantasy. You explore an enormous castle, consisting of no less than *255* labyrinths connected by 49 passages. Get to the corridors by blasting through the doors, whilst avoiding the extraordinary aliens. ... to your lasers by shocking

original game of lasting interest.

Ratings: /10
Graphics: 7
Sound: 7
Colour: 7
Originality: 8
Interest: 7
Order code: DOOCA

Jet Set Willy



Machine: 48k
Joystick: Kempston AGF Protek Interface II
Category: Arcade
Publisher: Software Projects

BONUS £3.45 PRICE

Price: £5.95 **Club price: £4.55**

At last! The long awaited sequal to 'Manic Miner'. The saga continues... Miner Willy has gone from rags to riches. Guide Willy around his clifftop mansion, as he searches for all the bottles and glasses after a party, before his housemaid, Maria, will let him crash out in bed. Check the beach, down the road, and on the rooftop.
Over 70 screens, amazing graphics and humour add up to make this one of the best for the Spectrum.

Ratings: /10
Graphics: 8
Sound: 7
Colour: 7
Originality: 9
Interest: 8
Order code: JETSE

Jokers Wild



Machine: 48k
Joystick: No
Category: Arcade/Adventure
Publisher: Phoenix Software

BONUS £3.45 PRICE

Price: £6.99 **Club price: £5.60**

A high quality value for money package—two games for the price of one. One game is arcade style, the other adventure.
Your mission is to defeat your enemies who are travelling the universe disguised as magicians. This year, the fair which they travel with has been set up on earth. Here they have been hypnotising unsuspecting earthlings, who are then led into 'bunko-booths' where they are robbed of their souls. The enemy's main power lies in a pack of hypnotic cards, which you must try to capture, first in the arcade game, then in the adventure.
Before you can play the adventure, you have to reach at least level 4 of the arcade game. From here on, on completion of each level further clues for use in the adventure are given. For those of you whose arcade or adventure playing skill is not quite up to scratch there is a useful 'Panic-Packet', which contains useful clues to help your game play. Good value.

Ratings: /10
Graphics: 6
Originality: 8
Interest: 7

Manic Miner



Machine: 48k
Joystick: Kempston AGF Protek Interface II
Category: Arcade/Adventure
Publisher: Software Projects

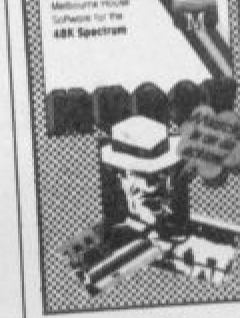
BONUS £3.45 PRICE

Price: £5.95 **Club price: £4.55**

Willy the Miner has fallen down a disused mine shaft. He works his way through the various levels collecting keys and searching for secret treasure. Manic Miner is a classic arcade game for the Spectrum—There are 20 caverns to penetrate, each requiring its own bit of ingenuity to ensure success.
A classic game that set the standards others are judged by.

Ratings: /10
Graphics: 8
Sound: 7
Colour: 9
Originality: 9
Interest: 9
Order code: MANSP

Mugsy



Machine: 48k
Joystick: No
Category: Strategy
Publisher: Melbourne House

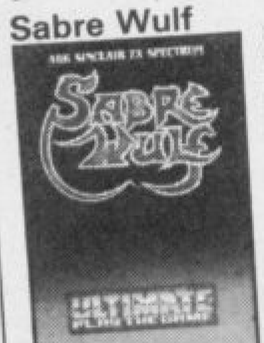
BONUS £4.95 PRICE

Price: £6.95 **Club price: £5.55**

From the publishers of the top selling adventure—The Hobbit—comes their newest release, MUGSY. The game can best be described as a comic strip featuring animated characters.
As Mugsy, you must organise your gang and their dealings—such as protection rackets and the purchase of weapons and ammunition, and most important of all make sure that your gang stays on top.
Muscle in on the action!

Ratings: /10
Graphics: 9
Sound: 9
Colour: 8
Originality: 10
Interest: 9
Order code: MUGSY

Sabre Wulf



Machine: 48k
Joystick: Kempston Cursor Sinclair Interface II
Category: Arcade/Adventure
Publisher: Ultimate

BONUS £6.95 PRICE

Price: £9.95 **Club price: £8.45**

From the publishers of Spectrum classics such as Atic Atac and Lunar Jetman now comes SABRE WULF, an arcade/adventure epic set in the deepest jungle.
The deeper you explore, risking life and limb, the more challenges you face: hippos, rhinos, warthogs, tarantulas, bats and a least 30

rican Football



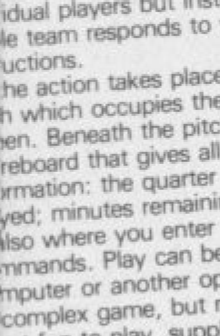
Machine: 48k Spectrum
Joystick: No
Category: Strategy
Publisher: Argus Press

: £9.95 **Club price: £8.45**

rican Football is a strategic lation, with fast animated hics. You do not control idual players but instead the le team responds to your ructions.
he action takes place on the h which occupies the top of the hen. Beneath the pitch is the reboard that gives all the relevant rmation: the quarter being yed; minutes remaining, etc. This lso where you enter your mmands. Play can be against the mputer or another opponent. complex game, but nevertheless eat fun to play, supplied with a full ide to American Football and mprehensive instructions.

atings: /10
raphics: 7 Originality: 9
ound: 6 Interest: 7
olour: 6 Order code: AMEFO

Pool



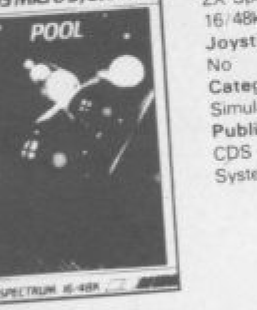
Machine: ZX Spectrum, 16/48k
Joystick: No
Category: Simulation
Publisher: CDS Micro Systems

Price: £5.95 **Club price: £4.45**

A really excellent simulation of the game of Pool using the full sound and colour graphics capabilities of the Spectrum to bring the action and excitement of the real game into your home. Use your skill and judgement, and play like the prpfessionals. 1 or 2 player game and demo mode. The *only* pool game worth considering for your 16 or 48k Spectrum.

Ratings: /10
Graphics: 8 Originality: 9
Sound: 8 Interest: 10
Colour: 8 Order code: POOL

Steve Davis Snooker



Machine: 48k Spectrum
Manufacturer: CDS Microsystems

BONUS £5.45 PRICE

Price: £7.95 **Club price: £6.75**

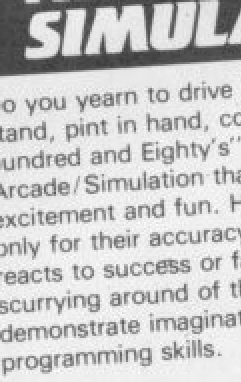
After the incredible success of Ocean's Decathlon, which must in comes "Steve Davis Snooker". Apart from his signature on the cover there are no other signs of intererence by Steve, but that doesn't in any way detract from the game, which is an excellent piece of programming. A feature we liked—though it is cheating a bit—is that you can go back and re-take your last shot! When you've just sunk the black when you were aiming for the yellow that's a useful feature! Ball control is excellent. You have full control over angle, power and spin and the movement is really smooth. With Currah speech connected the referee makes comments like "Ladies & Gentlemen quiet please", or "foul", plus a few others that are totally incomprehensible.
All in all this is an excellent simulation with smooth movement and very controllable ball action.

Ratings: /10
Graphics: 8 Originality: 8
Sound: 8 Interest: 9
Colour: 7 Order code: SDS

ARCADE SIMULATION

Do you yearn to drive a racing car, compete in the Olympics, or prehaps stand, pint in hand, competing against Eric Bristow and scoring "One hundred and Eighty's" time after time? If so, then you should find an Arcade/Simulation that'll fulfil your ambition—if not in reality, then in excitement and fun. Here we give a selection of the best—chosen not only for their accuracy but also for added touches like the way the athlete reacts to success or failure in Daley Thompson's decathlon, or the scurrying around of the ball-boys in Match Point. Features like these demonstrate imagination on the part of the author just as much as programming skills.

Beach Head



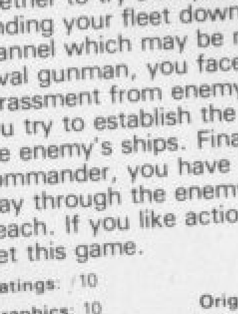
Joystick: Optional and redefineable keys
Category: Arcade Simulation Strategy
Publisher: Access

Price: £7.95 **Club price: £6.45**

Beach Head is a potent combination of arcade action, simulation and strategy, resulting in one of the most exciting *and* most realistic games currently available for the Spectrum. As Admiral of the Fleet, you have to decide between a full frontal assault or whether to try a surprise attack, sending your fleet down a side channel which may be mined. As naval gunman, you face constant harassment from enemy fighters as you try to establish the range of the enemy's ships. Finally, as tank commander, you have to fight your way through the enemy hald beach. If you like action you *must* get this game.

Ratings: /10
Graphics: 10 Originality: 10
Sound: 10 Interest: 10
Colour: 10 Order code: BEASP

Chequered Flag



Machine: 48k
Joystick: None
Category: Simulation
Publisher: Psion/Sinclair

BONUS £2.95 PRICE

Price: £6.95 **Club price: £5.45**

The most sophisticated motor racing simulation available for the Spectrum. Choose from ten tracks including Monaco, Brands Hatch and Silverstone and from three cars, one automatic and 2 with manual gearchange. Instruments include speedo, rev counter and fuel guages. As you drive around the 3D track you can see the nose of your car, the wheels and steering wheel turning, and the road ahead.
Very impressive 3D graphics, if you enjoy 3D simulations, you must add Chequered Flag to your collection.

Ratings: /10
Graphics: 9 Originality: 9
Sound: 5 Interest: 10
Colour: 6 Order code: CHEFL

Combat Lynx



Machine: 48k Spectrum
Joystick: Protek
Category: Arcade/Simulation
Publisher: Durrel Software

BONUS £5.95 PRICE

Price: £7.95 **Club price: £6.75**

Probably the most comprehensive real-time battle simulation available for your home computer. Combat Lynx can be played simply as an arcade game or more complexly as an arcade simulation. In the air-to-ground battle you are at the controls of a Lynx helicopter. You can select anti-tank, anti-aircraft missiles, machine guns or mines to arm your 'copter with. Your mission is to support your ground forces and to protect your ground bases. The number of bases depends on which of the 4 skill levels you choose.
From the pilot's seat in your Lynx you get a spectacular 3D view of the landscape and enemy troops. Around your view panel there are comprehensive instruments showing altitude, temperature, speed, fuel, weapon and navigation information.
An excellent 3D game featuring very smooth, realistic graphics. Recommended.

Ratings: /10
Graphics: 9 Originality: 9
Sound: 8 Interest: 8
Colour: 8 Order code: COMLY

Daley Thompson's Decathlon



Machine: 48k
Joystick: Kempston Sinclair
Category: Arcade
Publisher: Ocean

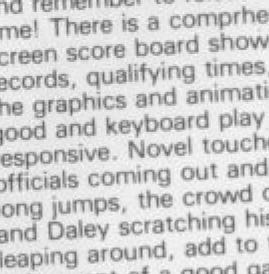
BONUS £4.95 PRICE

Price: £6.90 **Club price: £5.85**

Competing against the computer you are Daley Thompson, facing ten gruelling events.
On the first day you can choose to compete in the 100 metres, long jump, shot-put, high jump and 400 metres. The second day's events are the 110 metres hurdles, discus, pole-vault, and the 1500 metres. In the running events you animate Daley by either pressing two keys alternately, or rapidly moving the joystick from side to side. In the hurdles you press the fire button to jump. The throwing events require a little more skill and timing and a little less finger stamina!! In the long jump, after a good run up try to get a take-off angle as near to 45 degrees as possible. In the high jump, judge your take-off and the right time to fall, without knocking off the bar. In the pole-vault get the pole as close to 90 degrees as you can and plant it in the right place. In the javelin and discus work up a really powerful throw and remember to release it on time! There is a comprhensive on screen score board showing world records, qualifying times, etc. the graphics and animation are good and keyboard play is very responsive. Novel touches, like the officials coming out and measuring long jumps, the crowd cheering, and Daley scratching his head or leaping around, add to the enjoyment of a good game.

Ratings: /10
Graphics: 8 Originality: 6
Sound: 7 Interest: 9
Colour: 8 Order code: DALSP

Dartz



Machine: 48k
Joystick: No
Category: Simulation
Publisher: Automata

Price: £5.00 **Club price: £4.00**

At last—a good simulation of darts for your home computer. Aim carefully at the board but take into account the number of pints you've had tonight, and the crowd

LOGIC 3

...rd. When you have the combination rush along to ...om and reach into the ...n the safe has been ...e game musn't be given ...the flashing shields so ...n all flashing by hitting ...in.

...amusing game with many ...s touches that makes it ...n to play. Teachers will ...t you, and give you lines. ...s a school bully and a swot ...n) who tries to tell the head ...r mission.

...recommended.

Ratings: /10
Graphics: 9
Sound: 10
Originality: 10
Interest: 10
Order code: SKODA

The Pyramid



Machine: 48k
Joystick: Fuller Kempston AGF Protek Microgen
Category: Arcade/Adventure
Publisher: Fantasy

BONUS £2.95 PRICE

Price: £5.50 Club price: £4.15

Guide Ziggy, equipped with defence shield and phased plasmic laser, through the Pyramid, which consists of 120 chambers on 15 levels. Each chamber is inhabited by one of 60 varieties of weird creatures and aliens, ranging from galactic strawberries to demons and cosmic claws to mutant eyes. This arcade game will continue to amaze you for months, if not years!

Ratings: /10
Graphics: 7
Sound: 4
Colour: 7
Originality: 8
Interest: 8
Order code: THEPY

Strangeloop



Machine: 48k
Joystick: Any
Category: Arcade/Adventure
Publisher: Virgin Games

Price: £6.95 Club price: £5.90

A mammoth arcade/adventure with 240 rooms. The scene is an old robot factory, that used to produce domestic robots. That was un... about a hundred years ago, when the factory was taken over by powerful alien forces. Since then no human has set foot in the factory, until now!!!.....

Your mission is to regain control of the factory, as the robots have been reprogrammed to destroy Earth. Your only protection against the extremely hostile environment of the factory is your old "10th generation" space suit. The suit is constantly being torn and punctured by razor sharp industrial waste. If you're lucky you may find some patches lying around. You also have a laser, with a limited number of charges.

The top two-thirds of the screen is the playing area, which displays one of the 240 rooms. The rooms

...d your gun with the ...o their question and fire it ...before they land on you. ...graphics and sound plus a ...difficulty levels to suit any ...ke this a favourite with ...hild.

Order code: MATIN

...s for Children



Machine: 16/48k
Age range: 3-8 years
Category: Education
Publisher: Stell

...: £6.95 Club price: £5.25

...set of four educational games ...ides excellent value for money ...se—a series of different ...cts are displayed on the screen ...bed, etc.) You must decide in ...ch room each object belongs, ...move it there.

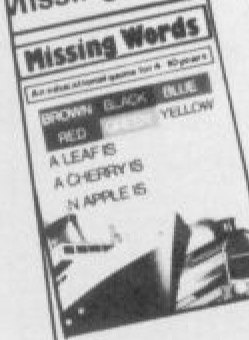
...mble—guess which word is in ...h balloon. Watch it fill with ...ur when you type in the right ...wer. You can also add your ...n words and save them.

...cture—can you identify the ...cture? Watch it move across the ...een when you guess the right ...swer.

...aze—find your way through the ...aze and reach the dog—7 levels.

Order code: MFC

Missing Words



Machine: 48k
Age range: 4-10 years
Category: Education
Publisher: Stell

Price: £6.95 Club price: £5.25

Two entertaining sections teach reading and English comprehension.

Section one displays single sentences with a word missing in each. The child must choose the correct word to fill the gap, from a choice of six words. Only two keys are used in this section, making it simple for even the youngest child.

Section two takes this theme one stage further. Now a full story is displayed on the screen with at least ten missing words in it. The child must decide which word should be used to fill in the gap, and type this in.

In both sections, a large number of different sentences and stories can be selected. Section two even allows you to type in your own story—e.g. your child's favourite nursery rhyme.

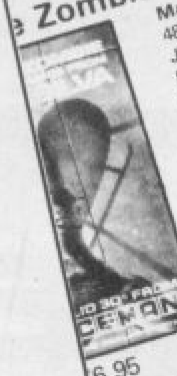
Order code: MISWO

WIN A MICRODRIVE

For details on how to win our Christmas Competition for a Microdrive and Interface 1, please refer to Page 14.

Originality: ...
Interest: 10
Order code: UNDER

...e Zombie



Machine: 48k
Joystick: Kempston Sinclair Protek
Category: Arcade/Adventure
Publisher: Quicksilva

...6.95 Club price: £5.90

...zing game that features ...marvellous firsts for the ...um. For the first time 3D ...d graphics are available in ...and Zombie Zombie also ...s the first two channel ...on the Spectrum.

...ame is set in the city of the ...ies, in which you arrive by ...pter. When you find a ...le place for landing, you can ...the helicopter and the action ...s.

...can move in any direction and ...un marginally faster than the ...bies, but there are a lot of ...bies and many are hidden ...nd the various maze-like walls ...e city. The Zombies are frail ...tures and can be blown ...y—this is your only defence ...inst them. However as soon as ...y get a taste of your flesh, their ...ngth improves dramatically. ...e part of the city that you are in ...n be viewed from 4 different ...gles, and by using a helicopter ...drop or pick up bricks the city ...n be changed infinitely, and ...fferent cities can then be saved ...n tape and loaded at another ...me.

...very impressive program, ...tunning 3D graphics and excellent ...ound effects.

Ratings: /10
Graphics: 9
Sound: 8
Colour: 8
Originality: 8
Interest: 9
Order code: ZOMZO

...ON

...expeditious flow of air-traffic; safe in that all aircraft must be kept apart, and expeditious so as to avoid undue delay. The work of an air traffic controller is very skilled and demanding, they each undergo about 3 years basic training. It is not surprising, therefore, that it may take some time to master the many tasks involved in this very realistic simulation.

Ratings: /10
Graphics: 9
Sound: N/A
Colour: 8
Originality: 10
Interest: 9
Order code: ATC

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